Evaluation of Construction Contract Termination as a Control Technique

By

Konstantinos C. Kalligeros

Bachelor of Science in Civil Engineering (2000)
National Technical University Athens

Submitted to the Department of Civil & Environmental Engineering
in Partial Fulfillment of the Requirements for the Degree of
Master of Science in Civil & Environmental Engineering

At the

Massachusetts Institute of Technology

June 2002

Signature of Author ....
Department of Civil & Environmental Engineering,
May 24, 2002

Certified By ....
Feniosky Peña-Mora
Associate Professor of Civil & Environmental Engineering
Thesis Supervisor

Accepted by ....
Oral Buyukozturk
Chairman, Departmental Committee of Graduate Studies

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ABSTRACT

Early termination (or cancellation) in construction is generally regarded as an unpleasant and costly last-resort control technique in the contractual relationship between the owner and the contractor, when their differences cannot be reconciled otherwise. Normally, construction contracts contain clauses that empower the owner to terminate if the contractor materially breaches the contract (i.e., termination for default) or if the project ceases to be in the benefit of the owner (i.e., termination for convenience). However, even if the owner has sufficient reason to terminate a contract, its doing so will not always result in higher benefits than if the contract had been allowed to complete. Part of the reason is the extensive litigation that traditionally follows termination decisions and its uncertain outcomes.

In this work, construction contract termination decision is examined from the owner's viewpoint. A review of the termination literature for research and development projects is performed. The legal and contractual treatment of construction termination is examined, mainly for two standard contract documents used in the US today: the American Institute of Architects (AIA) Standard Form of Agreement Between Owner and Contractor and the Federal Government Construction Contract. Two frameworks for monitoring construction contracts for the possibility of termination are developed: One for default and one for convenience. Finally, in search for a decision support framework and after examination of the appropriateness of various decision models for initiating contract termination, the multi-attribute utility model with decision tree analysis is explored. The use of the monitoring framework is illustrated with a idealized example based on a real case study.

Thesis Supervisor: Feniosky Peña-Mora
Title: Associate Professor of Civil & Environmental Engineering

To my parents, Irene and Chryssanthos,
whose support and encouragement has
led me throughout my entire life.
Especially during these two years, your
presence has been a true life-support.
Thank you for everything.

ACKNOWLEDGMENTS

I am grateful towards Professor Feniosky Peña-Mora for providing inspiration and support for my entire learning experience at MIT. This work is only a small distillation of the knowledge I have obtained working with him. I would like to thank him for diffusing his broad knowledge, experience and restless imagination and ambition in my work and myself personally. During this year of working together, he has been my *advisor*, in the true sense of the word.

Sanghyun Lee, Naz Majidi, Nethalie Assens, Sean McCone, Sofoklis Karapidakis, Victor Viteri and all my colleagues in Rooms 1-245 & 1-249 have also contributed to the completion of this work. Sofoklis Karapidakis introduced me to project management at MIT and provided sound research material necessary for the completion of this thesis. Naz Majidi would always find the books I needed first, thus reducing my trip to the library to a mere walk to her desk. Finally, I would like to thank ms. Joan McCusker for taking good care of all of us. These people have made finishing this work possible, each in their own ways.

BIOGRAPHICAL NOTE

Konstantinos Kalligeros received his undergraduate education from National Technical University in Athens, Greece (2000), specializing in structural engineering. He has gained experience in the field from working with designer and contractor firms in Greece and doing a summer internship in Europe.

At MIT, he enriched his training in structural design by following a relevant curriculum and working as a teaching assistant to Professor J. Kim Vandiver in Mechanical Vibrations. During his studies at MIT, he later directed his interest to project management.

Konstantinos Kalligeros' current research interests include financial valuation of large-scale engineering systems and processes, process integration during the development of large-scale engineering systems, building economics and information technology support for construction management.

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Chapter 1 INTRODUCTION - PROBLEM STATEMENT

1.1 PROBLEM STATEMENT

This work examines construction contracts terminated before completion. The focus is on occasions that the owner cancels its contract with the prime contractor. This work seeks to examine how termination is a control instrument in the hands of the owner, its value as such, and the factors for decision-making in using it.

Legally and fundamentally, there exist two modes of contract termination: Termination for default of the contractor, and termination for convenience of the owner. In certain contracts, the contractor is also allowed to cancel a contract. Both convenience termination and termination for default constitute a project control mechanism, although quite a rare, costly and undesirable one.

Termination for default is the last control instrument the owner has in response to a contractor who breaches (or is likely to breach) the performance requirements set on the contract. The laws provide plenty of other ways of insurance or remedy for the owner in case the contract is breached. However, contract provisions alone cannot always account for all the different cases of contractor non-performance. Also, these provisions often only act as a deterrent for the contractor not to breach the contract, and do not account for all compensation to the actual stakes of the owner. Finally, the complicated legal system makes termination decisions very complex and risky, providing little assurance that the intended result will be achieved by this control mechanism.

Termination for convenience is the owner's right to terminate a contract regardless of the contractor's performance. The drivers for such a decision are more often related to managerial and strategic issues regarding the project. In those cases, decision-making for termination in the construction industry shares similar principles with other industries, research and development projects in particular. There exists extensive literature about the decision to cancel research and development projects, and the decision support models used can be extrapolated into the construction industry, at least in part.

These models, both the ones for default termination and for convenience (or *strategic* termination), usually make use of statistical information relevant to other similar projects, decisions, and outcomes. This approach is inadequate in the case of default construction contract termination and strategic termination equally. The main reason is that they don't account for either legal and administrative issues, for the unique misalignment of interest experienced by the players in the construction industry, or the parameter of time (or else, waiting until more information is available). Therefore, construction contract termination needs to be evaluated with another approach.

Contract termination, even though a drastic measure, is a control instrument in both cases, strategic or for default. As such, it must be incorporated into a project management framework used by the development organization of the owner. Furthermore, termination itself must be evaluated, organized, planned, monitored and controlled.

How does the event of termination fit into the project management framework for construction development? How is it interpreted and used as a control instrument? How is termination itself evaluated, organized, planned, monitored and controlled? Answers to these questions are the main topic of this work.

1.2 THE EOPMCL FRAMEWORK

The event of early termination should be part of the project management framework of a project, especially for long-lasting, technically and financially demanding projects that exceed both the normal and historical capabilities of the development organizations as well as the owner's, and sociopolitical context's experiences.

The framework used is abbreviated as the EOPMCL project management framework: Project development is a continuous and iterative process of *Evaluating, Organizing, Planning, Monitoring, Controlling* and *Learning*. The choice and evaluation of a project in the context of the parent organization's strategic goals and the ecosystem, is the goal of the initiating phase in managing the product development process, Project Evaluation. The design of the development organization, the definition of the project organization, the team formation and the selection of the project manager are included in the Organization phase. Planning includes all the implementation activities as they are described in an established work breakdown structure, the work definition and the justification of the specifications. Monitoring, which belongs to the development stage, refers to tracking project performance. Controlling includes the necessary actions needed to minimize observed deviations from the cost, schedule and quality requirements. Contract termination is clearly a control instrument for the project: it is the owner's last resort and hope of correcting project deviations with respect to cost, quality and schedule, while controlling the interaction of the project with its natural and sociopolitical environment. Within the EOPMCL framework, contract termination requires:

- Organization (e.g., staffing and assigning responsibilities and decision power).
- Evaluation (by enumerating possible scenarios and assessing their utility to the organization and likelihood of occurring).
- A plan (i.e., an assessment of the risks and a map of the procedures to be followed in every case, usually by designing the contract).

- A monitoring system (e.g., comparing contractor or project performance with the tactical or strategic goals of the project, or by comparing how a single dispute or breach can invoke termination), and finally,

- Learning (because contract termination is not a simple procedure, and the organization will have plenty of lessons to extract from such situations).

The event of contract termination follows project development throughout its life cycle (Figure 1.2-1).

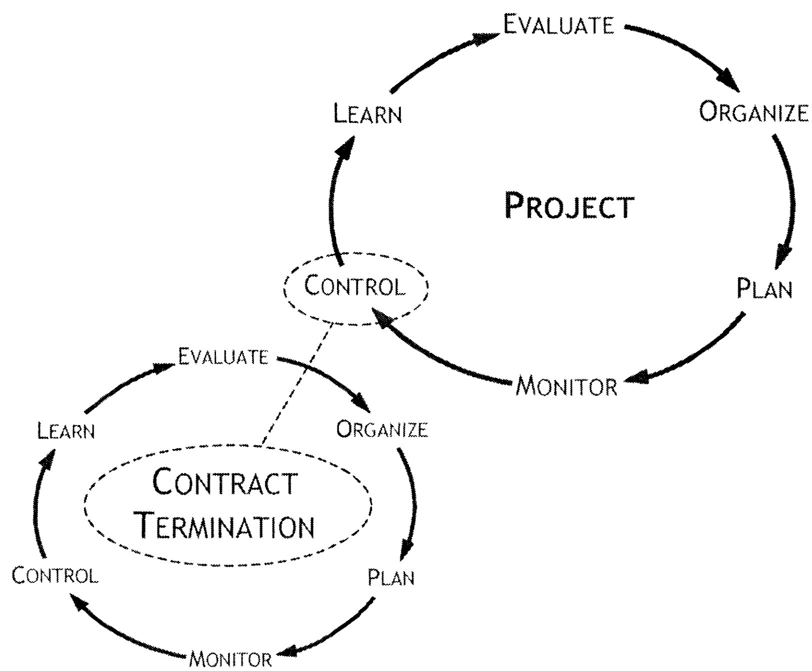

FIGURE 1.2-1: CONTRACT TERMINATION AS A POSSIBLE CONTROL INSTRUMENT

1.3 SCOPE OF WORK

To answer the question of how construction contract cancellation is evaluated, this work needs to cover related issues, such as:

1. Project cancellation in other industries and projects (mainly research and development, R&D)

2. Examination of contract law related to breach and cancellation.

3. Proposition of a set of elements of value that need to be monitored, and should enter the discussion about cancellation.

4. A qualitative and quantitative framework for valuating the decision to cancel a construction contract. For illustration, a recent and relevant case study is presented and examined within the framework developed.

1.3.1 PROJECT CANCELLATION IN OTHER INDUSTRIES AND PROJECTS

While successful completion and the subsequent "natural" death of projects is the goal around which all project management literature evolves, managers are often faced with projects with apparently little hope of delivering value. The subsequent dilemma of pursuing or canceling such an endeavor is easy when the project is largely unsuccessful, the salvage value is high and exit is easy. The call is harder in research and development projects that are characterized by great uncertainty, risk, vaguely defined budget and schedule, and are largely influenced by external and socio-political factors.

Incomplete projects are terminated by means of an intervention. There have to exist driving forces to the decision of terminating an ongoing project, as well as criteria for evaluating those drivers. The drivers for this decision are analyzed, and ways to evaluate their significance are also mentioned as concisely as possible, so as to serve as a guide for the decision to cancel a project. The management can identify which of the drivers are relevant to the project, and finally come up with an estimate of the overall value of the project to the organization, its potential for success and whether it should be continued or not.

Some knowledge and experience from early cancellation in fast-paced industries can be transferred to construction. Although the two worlds are entirely different, a construction contract cancellation framework may build on the experience and methods developed for R&D projects.

1.3.2 CONTRACTUAL & LEGAL TREATMENT OF CANCELLATION

Most construction contracts nowadays contain clauses empowering the owner to invoke cancellation, either for its convenience or for default of the contractor. These clauses, even expressed in legal language as they are, are fairly straight-forward. However, the legal implications and complications of cancellation are, in reality, very vague.

Various other contractual clauses and common laws affect legal decisions regarding the rightfulness of cancellation. This, along with the fact that most cancellations (especially for default) lead to litigation, poses significant risks for the owner who wishes to terminate a contract.

These issues are addressed in Chapter 3 in fair detail, in order to provide a set of elements of uncertainty which must be accounted for in the evaluation for cancellation.

1.3.3 A MONITORING FRAMEWORK FOR CONTRACT CANCELLATION

In the construction industry, the context of project development, and therefore, of contract cancellation, has unique characteristics. Even for cancellation for convenience, which in principle should be similar to other industries, there is usually a significant capital commitment in land and effort before a contract as cancelled. The driving factors for construction contract cancellation are very different than in other industries.

A set of factors driving construction contract cancellation is derived, of similar format and potential usefulness as the frameworks already developed for research and development projects. The framework for construction projects is two-fold, to account for the fundamentally different modes termination is encountered in: for default of the contractor or for the convenience of the owner.

1.3.4 A DECISION MODEL FOR CONSTRUCTION CONTRACT TERMINATION

Decision models for the evaluation of R&D projects for cancellation have already been developed in the literature, and the most significant are reviewed herein. However, the construction world presents differences that cannot potentially be dealt with, using these models. These differences will be analyzed in Chapter 4.

Because of these differences, an effort to provide a suitable framework for construction contract cancellation is made, which is as adopted to the construction world realities as possible. The framework presented consists of a monitoring scheme for termination factors (both for convenience and for default), and decision support using multi-attribute utility functions in a decision analysis and influence diagrams model.

Chapter 2 CANCELLATION OF RESEARCH AND DEVELOPMENT PROJECTS

Research and development (R&D) projects are characterized by great risk and uncertainty. The sources of risk and uncertainty derive from various special elements of the research and development industry: R&D projects involve technical uniqueness and innovation, and the outcomes often do not live up to the original standards and expectations. Furthermore, these projects are often developed in high-speed, short life cycle markets. Often, the R&D effort is obsolete before it is complete, either because of radical changes in competitors' technology, market conditions, technology costs etc. Finally, successful R&D efforts may simply be not marketable, which is often seen shortly before the completion of the project and could lead to its cancellation. These special characteristics of the R&D project ecosystem can be translated into "driving forces" for project early termination.

Driving forces can be promoting project cancellation whether rightfully or not, or they can be opposing it. Both modes have been the subject of a fair amount of management research for frameworks for risk assessment and decision support systems. The following sections summarize relevant research on cancellation of R&D projects.

2.1 DRIVERS FOR R&D PROJECT CANCELLATION

The driving forces that lead to premature termination usually emerge from the project ecosystem itself. They may be related to the project performance in terms of cost, quality and time, or they can be related to changes in the value of the end product to the stakeholders. Moreover, conflicts or changes in key-personnel morale and beliefs can drive a project to termination. Poor initial (systems) analysis and planning also accounts for many cancelled projects. The loss of a project's appeal to the market or the stakeholders during its execution, a lag behind the state of the art or excessive slipping in schedule are all consequences of poor planning, and can all lead to premature termination.

In every one of these cases, the dilemma is always between putting more money into the project or living with the sunk costs and canceling it. There are reasons (although not always reasonable ones) for managers to pursue either course of action. The effort in this section is to translate those reasons into independent criteria where possible.

Research has lead to various categorizations of the variety of factors that should indicate potential success or failure of the project, and therefore drive a decision to terminate. Some of them are focused on the organization, other drivers are inherent to the project environment, the market or the competition, and others have to do with the project performance itself. Termination drivers are identified as static and dynamic, the latter being the ones whose nature or importance changes throughout the life cycle of the project. The fact that the decision is never entirely rational has lead to the determination of psychological effects that drive (or rather, oppose) rational termination. Finally, there have been efforts to isolate those common forces that drive termination in different industries, countries and corporate cultures.

The identification of a global set of drivers for termination can assist future decisions in the environment of collaborative and geographically dispersed project development. Balachandra[3], independently compared the drivers of R&D project termination in four industrial countries. The research was conducted among organizations in the US, the UK, Germany and Japan, comparing the most important termination factors and their significance. Table 2.1-I provides a list of what is regarded as important termination factors by industries in these technologically advanced and highly industrialized countries, with similar market economies.

TABLE 2.1-I: COMMON FACTORS FOR PROJECT TERMINATION IN THE US, UNITED KINGDOM, GERMANY AND JAPAN, (ADOPTED FROM [3])

1	PROBABILITY OF SUCCESS VIA TECH ROUTE
2	DEVIATIONS IN TIME SCHEDULES
3	DEVIATIONS IN COST SCHEDULES
4	TIME OF ANTICIPATED COMPLETION
5	CHANCE EVENTS
6	SMOOTHNESS OF TECHNOLOGICAL ROUTE
7	PRESSURE ON PROJECT LEADER
8	CHANGE IN PROBABILITY OF COMMERCIAL SUCCESS
9	CHANGE IN NUMBER OF ENDURES
10	CHANGE IN SUPPORT OF PROJECT MANAGEMENT
11	CHANGE IN SUPPORT OF R&D MANAGEMENT
12	CHANGE IN COMMITMENT OF PROJECT LEADER
13	CHANGE IN AVAILABILITY OF EXPERTS
14	STAGE OF LIFECYCLE
15	ADAPTABILITY OF PROJECT LEADER

In addition to this "universal" list of termination factors, there are other elements of less importance depending on the organizational culture, the market economy and the intensity of the competition. Some of these factors are listed in Table 2.1-II.

A direct comparison between the project performance and a standard or a minimum can be performed for most of the items in Table 2.1-I and Table 2.1-II, and this should be the basis of decision models for termination. One set of factors that are not included in Table 2.1-I is related to the fact that the decision is made by people, affected by their own pre-occupations, beliefs or other circumstances in the organization or the project ecosystem. Most of the time, these factors oppose rational termination.

TABLE 2.1-II: SPECIAL DRIVERS FOR PROJECT CANCELLATION

16	THE DEGREE TO WHICH THE PROJECT IS WITHIN THE FINANCIAL CAPABILITIES OF THE ORGANIZATION
17	THE SUPPORT THE PROJECT RECEIVES FROM VARIOUS DEPARTMENTS IN THE ORGANIZATION
18	THE POTENTIAL OF THE PROJECT TEAM FOR INNOVATIVE WORK, IF IT APPLIES TO THE PROJECT
19	THE ORGANIZATION'S SOPHISTICATION AND POTENTIAL TO FULLY EXPLOIT THE OUTCOMES OF THE PROJECT.
20	THE PROJECT TEAM'S ENTHUSIASM AND VIGOR WORKING TOWARDS SUCCESS.
21	WHETHER THE ANTICIPATED OUTCOME OF THE PROJECT CAN BE SUBCONTRACTED MORE EFFECTIVELY.
22	INITIAL AND FINAL STAFF LEVELS.
23	FLEXIBILITY TO RESCHEDULE AND RE-CALCULATE THE BUDGET

2.2 FACTORS OPPOSING RATIONAL TERMINATION

The circumstances causing political opposition towards termination are hard to identify, evaluate and mitigate, and the relevant factors are not objective. Nevertheless, they can be very influential.

Managers' motivations for not terminating a project when they should, often outsource from the "successful manager role model". Managers are often rewarded for ignoring short-term difficulties and coming through rough times successfully. They are thus inclined to misinterpret major setbacks in the project as "bad weather". This perception of successful management can be further enhanced if failure is viewed with excessive disfavor by the organization. In organizations that severely "punish" failure, managers usually tend to favor low-risk projects and refuse to give up on failing ones. The effect can be seen clearly in projects that go awry slowly: The manager is confronted with many small setbacks instead of a big disaster, deals with them separately and fails (or chooses to fail) to see the big picture about the project and its lack of potential.

Failing to recognize a project without hope may also be because the manager personally believes in it. People, when called to make a judgment, tend to put additional weight to the factors that add value to their opinion, hope and beliefs. Managers in similar situations would find reasons to overstress supporting data and discredit contradictory information, if they are convinced that a project can be brought back to track.

Finally, declaring a project to have failed will hurt the project manager's ego. For the manager of a no-hope project, termination is not only equivalent to admitting that the project failed, but also that they failed to realize it sooner. Managers are thus committed in the game of continuously trying to justify their previous decisions, both to themselves and others. And since no one wants to appear incompetent, job insecurity and lack of supervisor support can only increase the need for external justification. However, a project manager seldom has enough decision power to keep a project in life by himself: Other parameters, larger than the project manager, usually play their role in supporting a project when they should not.

Factors outsourcing from the organization itself or its environment are often responsible for impeding withdrawal from losing projects. Perhaps the simplest of them is administrative inertia. Closing out a project both involves a lot of extra work and is also such a serious disruption from the daily routine of the organization, that no one is willing to invoke. Furthermore, projects are sometimes so closely tied to the marketing value of the organization, that they are not discontinued even if they are unsuccessful. Termination in such cases would render the organization unidentified in the market (try to imagine BIC without razor blades or ball-point pens). The unwillingness of organizations to give up on such projects can also be seen as some sort of inertia - one against strategic change. Finally, the socio-political environment may force the continuation of a project, despite its lack of potential.

Not all these advocates of the continuation of a project are necessarily present at the same time, and some may not be applicable at all in some projects. Often, the factors that affect the decision early in the life cycle of the project are excessive zeal and enthusiasm, outsourcing from lack of knowledge about the entire project ecosystem. Psychological and social drivers make themselves significant earlier than the organizational ones. Commitment to a loser project builds up slowly, resulting to projects continued so far beyond the logical point of termination, that completion ultimately becomes the only option even from a purely rational standpoint.

One way of mitigating the factors opposing rational termination is to include the option of termination in a life-long monitoring process (e.g., in project audits). This reminds key personnel that a project is a temporary commitment, and alleviates the pressure on the managers. Continuous evaluation also provides a quantitative scale and a basis for comparison for the evaluation of projects against predefined issues of concern (such as the ones in Table 2.1-I and Table 2.1-II).

2.3 CANCELLATION OF R&D PROJECTS: MONITORING FOR TERMINATION

The items in Table 2.1-I and Table 2.1-II are important termination drivers, but their usefulness in decision-making is limited. The list does not provide information about the origin of these drivers (organizational, project-oriented, environmental), their likelihood to evolve during project development (static or dynamic factors) or their potential for quantification. When implementing a robust decision process to project termination, it is necessary to elaborate these factors into categorized and independent criteria, and monitor the project's performance against them.

Meredith[15] proposes a system for monitoring a project and looking out for the need of early termination (Early Termination Monitoring System, ETMS). Monitoring occurs in 3 levels (or stages), in the form of audits (Table 2.3-I). In the system proposed, the monitoring function is separated from the project's management. The recipient of the each ETMS report should ideally be the functional element of the organization responsible for the project selection.

The three "steps" the system refers to, are actually audits conducted in three different timeframes. Step 1 is essentially a general organizational overview, conducted independently from any project at infrequent intervals. It has the purpose of determining the "personality" of the organization in terms of its attitude towards project cancellation. It should be repeated if there are suspicions or reasons that this personality has changed, e.g. when key personnel are replaced.

TABLE 2.3-I: EARLY TERMINATION MONITORING SYSTEM, ETMS (FROM [15])

Step 1:	Organizational Audit
	Encouragement Of Persistence
	Penalties For Failure
	Job Security
	Managerial Support
	Organizational Inertia

Step 2:	Post-Initiation Audit
2a.	**Static Project Factors**
	Prior Experience
	Company Image
	Political Forces
	High Sunk Costs
	Intermittent Rewards
	Salvage And Closing Costs
	Benefits At End
2b.	**Project Manager Factors**
	Persistence
	Reinforcement Susceptibility
	Confronting Mistakes
	Information Biasing
	Job Security

Step 3: On-Going Audits

3a. Dynamic Project Factors

Review Static Factors:
- Prior Experience
- Company Image
- Political Forces
- High Sunk Costs
- Intermittent Rewards
- Salvage And Closing Costs
- Benefits At End

Task - Team:
- Difficulty Achieving Technical Performance
- Difficulty Solving Technological Or Manufacturing Problems
- Time To Completion Lengthening
- Missing Project Time Or Performance Milestones
- Lowered Team Innovativeness
- Loss Of Team Or Project Manager Enthusiasm

Sponsorship:
- Project Less Consistent With Organizational Goals
- Weaker Linkage With Other Projects
- Lower Impact On The Company
- Less Importance To The Firm
- Reduced Problem Or Opportunity
- Less To Management Commitment To Project
- Loss Of Project Champion

Economics:
- Lower Project ROI, ROS, Market Share Or Profit
- Higher Cost To Complete Project
- Less Capital Availability
- Longer Time To Project Returns
- Missing Project Cost Milestones
- Reduced Match Of Project Financial Scope To The Organization

Environment:
- Better Alternatives Available
- Increased Competition
- Less Able To Protect Results
- Increased Government Restrictions

User / Client:
- Market Need Obviated
- Market Factors Changed
- Reduced Market Receptiveness
- Decreased Number Of End Use Alternatives
- Reduced Likelihood of Successful Commercialization
- Less Chance Of Extended Or Continuing Success

3b. Organizational & Managerial Factors

- Evaluate Interactions And Progress Of Factors In Steps 1 and 2b

Step 2 should follow the initiation of every project, and it considers both organizational and project-oriented aspects, and their interaction. The project factors considered at this stage are static, in the sense that they reflect project objectives and can be evaluated before any progress is made.

Stage 3 aims to capture the changes in the dynamic project factors, and how they interact with the organizational and the static project factors. Apart from a methodological tool, the proposed system also provides a concise listing of most of the criteria that should be taken into account for the decision.

Those elements that are inherent to the organization or the manager and impede proper cancellation of failing projects are mostly of emotional nature and are also hard to bring out in an organizational audit (Step 1). Assessing static project factors in a post-initiation audit (Step 2) is easier, as they are more project-focused and more specific. The organization's prior experience in the nature of the project enables the manager to evaluate the significance of difficulties encountered more successfully. It is also important, even if it is relatively easy, to evaluate the relation of the project to the organization's market image, and the effect on the latter if the project fails. The political forces involved must also be identified beforehand. Attempting to terminate a project in the face of political forces may bring excessive pressure to the organization.

Such forces play a role in the case of the Deep Tunnel Project. The Deep Tunnel Project in Chicago is a major attempt to improve the city's ability to handle major floods by expanding the sewer system. The project is already significantly over budget and late, with an anticipated completion date currently in 2012. Canceling the project is now impossible, as its salvage value is close to zero: No value is delivered to stakeholders unless the project is complete.

In projects like the Deep Tunnel, benefits come at the end. This characteristic has to be identified early, before progress makes termination unacceptable. In contrast, other projects may deliver intermediate rewards during development, which can fool the manager into interpreting them as progress towards the end goals. The intermediate and final goals of a project should be identified early, so that final success or failure is not examined in view of the "side-products" of project development. Although goal identification and separation belongs to initial project proposition and selection, it can be repeated in the post-initiation audit so that it follows the ETMS throughout the project. Once the project's and the organization's factors for susceptibility to erroneous decisions as to project cancellation are identified, they have to be continuously compared to the dynamic project factors during the life cycle of the project.

The dynamic project factors included in Table 2.3-I are essentially a list of the most important reasons for project failure, as they have been identified in the literature. The term "dynamic" implies the exception of characteristics or shortcomings of the organization that could lead to project failure; it focuses attention to the changing and unpredictable components of the project's ecosystem throughout its lifetime, and to factors whose importance changes during the life cycle of the project.

The dynamic factors for project success do not necessarily remain equally significant during the project life cycle, and depending on the time the on-going audit is conducted, emphasis should be given to the appropriate ones. A relevant research on contractual projects[3] has revealed that during the system (or conceptual) design phase, successful client consultation and the explicit establishment of the mission of the project are most important factors for its success. During the detailed design and planning, top management support also becomes significant, while the detailed design should also be elaborately explained to and accepted by the client. In the development phase, the trouble-shooting methods, the project's accordance to time and cost schedules and technical requirements, as well as continuous client consultation become critical. These factors are only a sample of the large pool of dynamic factors the on-going audit should take into account.

There are five areas in which the project manager may face unpredictable and dynamic change - thus five main areas of investigation for the on-going audits (Step 3):

1. What is considered static and known, such as the static factors of the second step, may always change (however self-contradictory this may seem), and on-going audits should check for such changes.
2. The interaction between the work obligations of the project and the project teams should be examined. The difficulty the teams face resolving technical objectives or manufacturing problems and their loss of enthusiasm, innovativeness and commitment, are usually indicated by missed milestones and continuous stretching of the expected time to results.
3. The value of the project to the stakeholders needs to be reviewed. If the project becomes less important to them, their commitment and the pressure to the organization to complete the project will also drop. Also, market conditions may change, making the success of the result less likely in the short or the long run.
4. The fluctuation of pure economic facts about the project should be taken into account. The projected return on investment (ROI) or sales (ROS), market share or profit etc., should be compared to the original expectations and conclusions should be reached.
5. The political and natural environment the project is developed in and its dynamics should be closely and honestly accounted for. It is important to identify the ways the project affects them or is vulnerable to changes in them. Also, it is vital to project and try to predict the state of the environment at the operational phase of the project.

The need of comparing all the organizational, project and dynamic factors of project development in order to obtain an educated cancellation decision has led to relevant models. Most of these models are quantitative by assigning values to each of the monitored factors and comparing them to target values or benchmarking data. Their strength lies in the usage of acquired knowledge and experience, and in their relative simplicity. On the other hand, some are too simplistic and do not capture neither the dynamics of project development or the real option value of decisions and policies. Worse, most termination evaluation models rely on the evaluators' estimation of scores for the termination factors, thus enhancing the psychological and organizational elements mentioned in Section 2.2. These models, as well as alternative termination evaluation techniques, are presented extensively later in the text.

Chapter 3 TERMS AND LEGAL PROVISIONS

3.1 INTRODUCTION

Contract termination was first introduced in the United States towards the end of the civil war. The government found itself tied up in multiple contracts for infrastructure and equipment to support the military operations, when the war ended and the need for the contracted work ceased. The clause included in subsequent contracts was meant to protect the government against the obligation to continue contract work even after dramatic changes in the project ecosystem. Since then, the use of the clause has been such as to permit the owner to terminate for practically any reason.

Today, the possibility of contract termination (entirely or in part) is treated in most construction contracts. In most cases, the right to terminate a contract between an owner and the prime contractor is reserved for the owner, although it is possible that the contractor reserves the same privilege. In the same way, subcontracts between the prime contractor and a subcontractor often include clauses for cancellation.

For the owner, the right to termination is justified in contracts for two reasons: *Termination for default* of the contractor and *termination for the convenience* of the owner. The former case is applicable in cases the contractor materially fails to meet its contractual obligations (is in default). The latter case refers to the owner's privilege to cancel a contract with a contractor without necessarily disclosing any reason.

Contract Termination is legally treated and enforced as a last controlling technique; indeed, it is rare. Because in both cases the owner reserves the right to proceed to an action with great repercussions for the contractor, the laws (and courts) require that this right is used with prudence and in good intent. The privilege itself is almost never questioned in contracts or in court, however, the provisions regarding final payment, ongoing commitments by the contractor and compensation differ greatly among contracts and court rulings.

The legislation for each of the two cases, being substantially different in both legal and practical terms, is treated in the sections to follow. Relevant issues and contractual provisions are mentioned next, and the chapter closes with citations and samples of termination-related clauses.

3.2 CURRENT CONTRACT LITERATURE

Since the initial introduction of the clause in military government contracts, the termination clause began being used for all government projects, and subsequently spread to the private sector as well. Today, standardized contracts used in both public and private construction include termination clauses, but specific provisions differ.

Because of their popularity or extend of usage in the US, the following discussion will focus on two standard contracts: The *Federal Government Construction Contract*, and the *American Institute of Architects (AIA) Standard Form of Agreement Between Owner and Contractor.*

FEDERAL GOVERNMENT CONSTRUCTION CONTRACT

This form of contract is used by all federal government construction contracts. The US army corps of engineers, the US Navy Facilities Engineering Command, the US Bureau of Public Roads and other organizations employ this format for construction projects. Special provisions differ among each agency's contracts, but only slightly. Part 49 of the Federal Acquisitions Regulation[29] provides the policies and procedures relating to the complete or partial termination of federal contracts for the convenience of the government or for default.

AMERICAN INSTITUTE OF ARCHITECTS (AIA) STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

The AIA contract is very widely used for fixed-price building construction in the private sector in the US. Although it provides the right to terminate to both the owner and the contractor, the AIA documents implicitly discourage termination through various provisions.

These standard documents have been updated over time, to include provisions relevant to most situations that arise in construction situations. Generally, they provide for termination by mutual agreement, and they enforce contractual power to terminate. These situations are discussed further.

3.2.1 TERMINATION BY MUTUAL AGREEMENT

In the same manner that the owner and contractor engage into an agreement, they have the power to mutually cancel it. Legally and formally, the termination of a contract in consent is similar to a new contract.

However, issues arise. In practice, when one party initiates discussion for the termination of a contract and the other party does not expressly accept, whether termination occurred by mutual agreement, and whether compensation is due has to be determined from the actions of the two parties after the proposition to cancel. These cases are usually settled in court. Other issues involve unbalanced benefits from the contract at the point of mutual cancellation. If the contractor is paid for work it has not performed at the time of cancellation, the termination decision might not be enforced.

In any case, when a contract is cancelled by mutual agreement, it is obvious that both parties have established their best interest in doing so. Thus, the situation does not pose a question of evaluation other than that of individually assessing the circumstances that lead both parties to agree.

3.2.2 TERMINATION FOR DEFAULT

The owner may (partially or fully) terminate a contract when the contractor's performance substantially deviates from the contractual agreement, thus constituting a breach. The owner may subsequently continue the terminated work on their own responsibility, re-bid the terminated portion of the contract, or cancel it altogether. Some standard contracts allow for partial termination while others do not specifically state so.

Partial termination can be to the benefit of the contractor: The owner may not fully terminate a partially complete, logically and technically divisible project without risking being accused of bad faith in doing so. The owner is thus inclined to opt for partial termination and therefore compensation of the contractor for the work performed already (depending on the quality).

This rationale brings out two major issues in termination for default. First, the owner must be judged to be acting in good faith, in other words, the reasons causing the owner to take this course of action must be material an important. This means that the owner can clearly see no alternative to terminating the contract. Minor variances from the contractual schedule, budget or quality do not usually provide grounds for termination. Otherwise, termination can be considered to be intentional and wrongful thus allowing for punitive damages for the contractor. On the other hand, courts are reluctant to impose punitive damages on the basis of wrongful termination, because that can create legal precedence on which terminations in the future can be easily disputed.

The second issue is the undisputed responsibility of the contractor. In using their right to terminate a contract, the owner must be sure that the reasons for default arise only from responsibilities of the contractor, and cannot be rooted back to actions of the owner. Otherwise, the termination is very likely to be challenged by the contractor and if it is found unsubstantiated, the penalties for the owner can be severe. Obviously, in a real construction situation, proving this for a fact is very hard. Consequently, the owner who invokes termination for default takes the risk of the contractor being able to prove that the default can be justified by actions of the owner.

The issues mentioned above provide two important risk factors the owner must consider when using the termination right. The probability of a termination action ultimately achieving its lawful intended purpose, i.e., the proper delivery of the project, must enter the decision rules and models of the owner and direct their actions.

3.2.3 TERMINATION FOR CONVENIENCE OF THE OWNER

By the relevant clause, now common to both public and private contracts, the owner reserves the right to unilaterally terminate a contract for their convenience. Federal procurement law has also developed the idea of *constructive convenience termination,* by which a wrongful default termination can be converted into a convenience termination.

Invoking the clause requires the contractor to stop all work, place no further purchase orders, cancel orders already made, and perform all other acts designed to terminate performance and protect the interests of the owner. The contractor is reimbursed for work performed unavoidable losses suffered, and expenses intended to protect the owner's interest. Also, the contractor is paid the agreed profit for the work performed.

Inasmuch as the convenience termination clause gives apparent unlimited power to the owner, it is not without restrictions. An important one derives by a court order of 1982[1], by which the US government was not allowed to terminate the contractor and use a cheaper one to finish the work, since the US government knew of the existence of the cheaper contractor at the time of the bid. The bottom line is that convenience termination is allowed if the project ecosystem has significantly changed. While rather vague, in real terms

[1] 681 F.2d 756 (Ct.Cl.1982) Torncello v. United States

this condition reduces the usefulness of convenience termination significantly. A convenience termination that does not follow a significant change in the project ecosystem may be deemed as *abuse of discretion* in court, resulting in large compensation for the contractor.

The AIA contract provides that the owner can suspend without cause, but is not specific about termination. In this case, it provides for increases in the cost of performance, including profit on the increased cost of performance caused by any suspension, delay or interruption by the owner.

3.2.4 TERMINATION BY THE CONTRACTOR

In general, contract draft prepared by the owner will not contain termination privileges for the contractor. On the other hand, drafts prepared by professional associations will. Indeed, the Federal Government Construction Contract does not provide such clauses.

The AIA contract allows the contractor to terminate a contract for default, even though under very specific circumstances. A 30-day stoppage of work caused by specific events, give the contactor right to terminate AIA contracts made before 1987. Another clause was added then, permitting the contractor to cancel a contract if the has been a 60-day work stoppage caused by the owner's failure to perform "matters important to the progress of work." Still, termination is not effective until 7 days of written notice have passed.

In addition, the AIA document permits the contractor to terminate for convenience if there are repeated suspensions, delays, or interruptions of work that aggregate to more than 100% of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less. The same privilege is granted if a relevant court order is enforced, or if a government act or other emergency makes material and resources unavailable. These conditions, as described in paragraph 14.1.1 of the AIA contract, qualify by nature for convenience termination by the contractor.

3.3 FINANCIAL RESTITUTION

At the time of termination, the two contracted parties will surely have conferred benefits to one another. The owner will have made progress payments to the contractor, and vice-versa, the contractor will have completed and perhaps handed over part of the work. Under termination, these benefits are sometimes subject to restitution, or recovery, for both parties.

If termination has been made for the convenience of the owner, the contract will provide a formula for the calculation of these benefits. In termination for default of the contractor, it is usually the owner what will have claims against the contractor, which will exceed the value of unpaid work performed by the contractor. The owner is then entitled to these benefits. If the benefits claimed by the owner do not exceed payments for work performed already, the contractor, although in default, is usually entitled to them.

Generally, courts hold that work performed is subject to payment, and this rationale governs relevant settlements. On the other hand, the conditions and potential outcomes of termination put these amounts under risk, and their calculation is not certain. This risk is what drives the decision-making process for termination, both for default and for convenience.

3.4 OTHER RELATED CLAUSES

A set of standard contract clauses is relevant to termination and the procedures followed thereafter. Also, they are related to schedule and cost issues arising from contract termination, and to special conditions that affect the feasibility and attractiveness of the option to terminate. These contractual clauses and provisions will prove critical in assessing and evaluating the decision to terminate, as they are vital in determining the risk and value of termination at any given instance, either for convenience of for default.

The law governing contracts is provides for conditions for termination. These clauses are valid even if they are not mentioned specifically in a contract, and even in case they are, courts may enforce the law rather than contractual clauses. In order to provide as sound a basis for agreement as possible however, construction contracts refer to termination in several different clauses. The most important of them are: *material or future breach of the contract, bankruptcy, surety bonds, liquidated damages, bidding and bid rejection.* These issues are discussed in the following sections.

3.4.1 MATERIAL BREACH OF THE CONTRACT

Considering the complexity of both a construction situation and the contracts and laws that govern it, it is almost impossible for all parties to act in agreement with the contract at all times during a project. Most often, one or both parties in a contract will breach it in some way. At the lack of the notion of *material breach,* any breach of a contract would formally enable the non-breaching party to invoke termination clauses.

Material breach is the term used in contracts to refer to situations where the invocation of termination clauses (or other drastic measures) is permissible. Nevertheless, it is very hard to define exactly what a material breach of a clause is. Courts usually determine the materiality of breach by focusing on the following factors:

1. The importance of the deviation from the contractual basis, within reason, and the likelihood of future non-conformance.
2. The feasibility of compensation of the owner for the contractor's non-conformance. This depends on whether the subject of the breach is easily correctable, and on whether the actual damage caused is easily measurable.

3. The non-recoverable losses suffered by the contractor if the contract is indeed terminated. This depends on the financial status of the contractor, the volume of unused material ordered or delivered etc.

4. The true reasons for non-conformance. This is the most difficult point to prove in a courtroom. Arguments would include cross-accusations between the parties, Force Majeure, and previous breaches of the contract (material or not). The true reasons for non-conformance, as well as the circumstances under which they become known during construction can play a major role in determining the materiality of a breach.

5. The contract itself. The language used in a contract for various matters is usually a good indication of whether these matters are perceived as important or not. A breach of such clauses may constitute a material breach of the contract.

6. The *immediate* reaction of the non-breaching party to the breach. If the reaction is a formal and prompt *written notice of protest*, then the breach is likely to be perceived as material. On the other hand, if there is no reaction at all, the non-breaching party may be considered to have waived its relevant rights. In a relevant court ruling[2], the court held that "Where a contract is ambiguous, the court will accord considerable weight to the construction the parties themselves give to it, evidenced by subsequent statements, acts and conduct."

The importance of justifying the existence of a material breach is paramount for termination. Otherwise, as mentioned above, termination can be judged to be wrongful, with serious financial consequences for the terminating party. As the matter of fact, improper termination constitutes a material breach.

[2] RAD-Razorback Limited Partnership v. B.G. Coney Co., 713 S.W.2d 462 (Ark.1986)

Improper termination can be viewed as interference with contractual performance, specifically, it can be interpreted as complete prevention of the contractor from performing. In addition to the losses suffered related to the wrongfully terminated contract, the contractor will usually claim losses from damage to its reputation, loss of bonding capacity and if applicable, bankruptcy. The monetary damages involved are usually very high.

From the above, it is evident that termination is likely to kick back to the terminating party, if the breach on which it is based cannot be proven to be material. Real situations are much more complicated than described here, as they usually involve numerous breaches of the contract by both parties, some of which can be judged as material, and some others are the consequences of previous breaches or ways of conduct. Determination in those situations is sought in a court of law, with uncertain outcomes for both parties. Effectively, the risk in using the termination clause lightly is too great, and the implications are too important. Establishing termination grounds on a material breach should be one of the leading risk factors for termination decision support.

3.4.2 FUTURE (ANTICIPATORY) BREACH OF THE CONTRACT

In contrast to the previous section, which deals with breaches that have already occurred, this section discusses breaches that may happen in the future (anticipatory). These may result from two situations:

1. A substantiated expectation that one party will not conform to the contract in the future. Such situations may appear to constitute a breach of the contract: The parties must, at all times, at least appear capable of delivering their part of the contract. Providing assurance of capability to perform is in the essence of a contract.
2. A threat that one party will not conform to the contract in the future. A protest for breach can be filed based on such a threat, if there exist

concrete evidence that the threatening party is determined to carry out the threat.

Anticipatory breach is likely to occur in private construction, in the event that the owner appears to become unable to make payments because of its financial status. In this case, the contractor may claim an anticipatory breach of the contract. Reciprocally, the contractor may prospectively breach the contract if it experiences a massive turnover or firing of employees, unavailability of subcontractors, if it cancels purchase orders, or if it fails to provide assurance for any of the above.

Obviously, anticipatory breach of the contract is even more vague and hard to prove than material breach, especially in the presence of surety bonds and liquidated damages clauses, discussed in following sections. Future breach is all about probabilities. The question is whether the owner (contractor) should wait for more information about the contractor's (owner's) ability or intention to conform, at the additional expenses involved, or whether it should terminate the contract instantly on the basis of a future breach. To complicate matters even more, the law provides that one party may not recover damages caused by another party's breach, when those damages could have been avoided by taking reasonable steps to cut down or eliminate the loss. These questions should also enter the decision models for termination as in the previous paragraph (material breach). Furthermore, it is evident that the laws concerning anticipatory breach impose the factor of timing a termination. These issues will be addressed qualitatively and quantitatively in Chapter 5.

3.4.3 BANKRUPTCY

Bankruptcy can be associated with termination in two ways, depending on which party wishes to terminate the contract, the bankrupt or the financially healthy one. Construction contracts used to allow automatic cancellation of contracts if a party filed for bankruptcy. The owner was usually given the power to terminate if the contractor filed for bankruptcy or had serious financial problems (see also Section 3.4.2). Contradicting this, the US Congress overrode this law (and any deriving contract clauses), by updating bankruptcy law to provide that the bankrupt party is given the choice of continuing or rejecting performance. In the presence of surety bonds (see Section 3.4.4), the surety is not released of its obligations when the contractor bankrupts, rather, it must make the relevant guarantees good and seek recovery of the penal sum from the bankrupt contractor (with little hope of succeeding).

Although the probability of termination due to bankruptcy of either party is large, it does not pose an interesting decision making problem. In either case of bankruptcy, the economic issues are taken over by surety and financial institutions. The relevant decisions for both the project and the involved parties are fairly easy and will not concern us further.

3.4.4 SURETY BONDS

Surety bonds are essentially hired guarantees of performance, bidding and labor and material coverage, on behalf of the contractor. They are different from insurance contracts in that the obligations are not limited to those deriving from natural phenomena, but include the bonded parties' responsibilities.

In standard practice, the contractor (*the Principal*) pays a fee[3] (*a premium*) to a large, stable and reliable financial institution (*the Surety*), in exchange for a promise (*guarantee*) that the surety makes to the owner (*the Obligee*) that the contractor will perform according to the contract. The guarantee is bounded below a monetary limit that the surety is responsible for, the *Penal Sum*. The amount of the penal sum is stated in various ways, depending on the type of bond it corresponds to. In case the surety is called to back up the guarantee,

[3] The price of the bond is in the neighbourhood of 0.5% of the value of the contract. In case the bond is issued after the price of the contract is agreed on, then the owner pays the fee.

the principal and all other *indemnitors* are liable to compensate the surety for these costs. However, these costs can be so large that cannot be recovered by the surety. This is the reason why the surety, taking the risk of guaranteeing, does not rely on the principal's financial strength but on its competence and likelihood of completing the contract.

The existence of a surety bond means the existence of another two contracts, further than the one between the contractor and the owner: One contract exists between the surety and the owner, and another between the surety and the contractor. This structure of contractual obligations is shown in Figure 3.4-1.

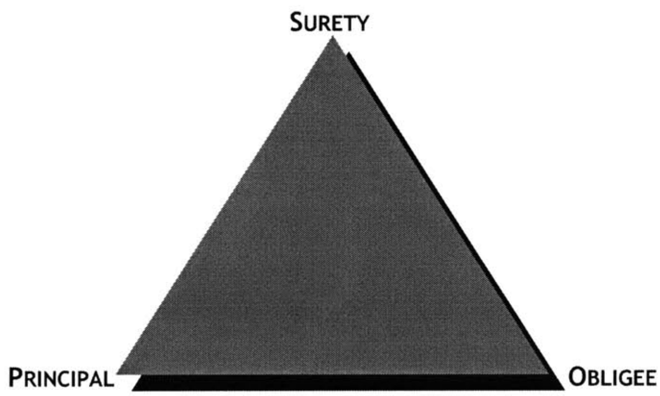

FIGURE 3.4-1: THE TRIANGULAR CONTRACTUAL STRUCTURE OF SURETY BONDS

There are three types of bonds required in construction contracts: The *Bid bond*, the *Performance Bond*, and the *Payment Bond*.

BID BONDS

The guarantee of bid bonds is summarized in the following points:

- The surety guarantees to the Obligee that the principal will enter into contract, if it wins the bid.
- The surety guarantees to the Obligee that the principal will furnish the performance bond and other insurance policies required in the contract.

The penal sum for the bid bond is meant to recover the Obligee's real damages for the principal's failure to conform to the conditions above. In agreement to this, the penal sum is determined either from liquidated damages clauses contained in the bid (usually as a fixed amount or percentage of the contract value), or from determination of the real damages suffered by the Obligee.

PAYMENT BONDS

The guarantee in a payment bond is the surety's promise that it will pay subcontractors and suppliers if the prime contractor fails or refuses to do so. The existence of the guarantee requires that the subcontractors and suppliers (*claimants*) have a contract with the principal (the prime contractor). However, this condition alone is not sufficient. The claimant must prove that the material provided were "used or reasonably required in the performance of the construction contract." This phrase focuses attention to hardcopy material used on site, and excludes some important sources of cost for the subcontractor, such as overhead costs, as well as estimation and preparation costs. Further discussion of payment bonds and their necessity requires the distinction between public and private construction.

In the private sector, an unpaid subcontractor or supplier may file liens (legal claims) against the property of the owner under the *Mechanic's Liens* laws. Naturally, owners wish to avoid this event, and usually require that the contractor furnish a payment bond. In the public sector, the federal government and states are indemnified from such liens. That is, a claimant may not claim federal or state property under the mechanic's liens law. There are other routes a claimant may seek compensation in a public project, e.g., by presenting claims against public bodies and request special legislation in Congress, state legislatures or city councils, but both the government and the states wish to avoid such costly and time consuming procedures. The Miller Act, applicable to federal contracts, and Little Miller Acts, applicable to state contracts, provided the legal solution to this problem.

In the United States, the law requiring contract surety payment bonds on federal construction projects is known as the Miller Act (1935, 40 U.S.C. Section 270a to 270f). The Miller Act requires the general contractor on a federal project to post two bonds: a performance bond and a labor and material payment bond.

The Miller Act states that, for contracts exceeding $100,000 in amount for the construction, alteration, or repair of any public work in the U.S., the general contractor to whom the job is awarded must be able to supply the owner with:

1. A *performance bond* in an amount that the contracting officer regards as adequate for the protection of the United States. The bond amount is normally 100 percent of the contract price.

2. A separate *payment bond* for the protection of suppliers of labor and materials. The amount of the payment bond shall be equal to the total amount payable by the terms of the contract unless the contracting officer awarding the contract makes a written determination supported by specific findings that a payment bond in that amount is impractical, in which case the amount of the payment bond shall be set by the contracting officer. In no case shall the amount of the payment bond be less than the amount of the performance bond.

Formerly under the Miller Act, payment bonds did not have to be greater than 2.5 million dollars, regardless of the value of the general contract. The sum of the payment bond was 50% of the contract price when the contract was less than $1-million and 40% when the contract was from $1-million to $5-million. The 1999 Act requires that the bond be equal to the performance bond amount, usually the total amount due under the contract, affording more protection to subcontractors and suppliers.

The Miller Act payment bond covers subcontractors and suppliers of material who have direct contracts with the prime contractor (i.e., *first-tier claimants*).

Subcontractors and material suppliers who have contracts with a subcontractor, but not those who have contracts with a supplier, are also covered and are called second-tier claimants. Anyone further down the contract chain is considered too remote and cannot assert a claim against a Miller Act payment bond posted by the contractor. The Construction Industry Payment Protection Act of 1999 also prohibits prime contractors from requiring subcontractors to waive their payment bond rights in the subcontract documents.

Many states in the U.S. have adapted the Miller Act for use at the state level. These state statutes are known as Little Miller Acts. State courts interpreting their own laws will often look to federal case law for guidance. This discussion of the Miller Act is a good starting point for all other payment bonds. However, state bond laws vary from the federal laws, and state courts are not bound by federal court rulings. Laws vary from state to state and wise contractors understand the bond laws prior to working in other states.

Early termination of a contract between the owner and the contractor is mostly related to performance and bid bonds. They formally assure financial compensation in case of contract breach and in most contracts, the procedures as well as methods for calculating the rightful compensation will be provided.

PERFORMANCE BONDS

The guarantee of a performance bond is the surety's promise to fulfill the principal's obligations towards the contract between the principal and the obligee, in the case the principal breaches this contract. The guarantee cannot be called against in the event of a principal's failure to perform that is caused by the obligee's actions or conduct or by an act of God (force Majeure). This is a central issue of question in disputes and calls against performance bonds: Before the surety is obliged to make compensate the obligee, it must be firmly established that the responsibility for non-performance belongs entirely to the principal.

This is one of the reasons a performance bond does not completely hedge the owner for non-performance of the contractor. In real situations, it is hard to prove that the responsibility lies solely with the contractor, and the surety will not act in benefit of the owner unless it is established beyond doubt that the contractor is in default. The wording of the bond also contributes to this, by often being vague as to the aspects of the contractor's performance that are backed by the bond. AIA document A311 states "...if the contractor shall promptly and faithfully perform said contract then this obligation shall be null and void; otherwise it shall remain in full force and effect."

But performance bonds provide only partial hedging for other reasons as well. If the contractor is financially strong, the surety is even less likely to respond to the owner's concerns immediately, since it knows that whatever extra claims generated by waiting more, will be ultimately covered by the contractor. Furthermore, if the surety acts and pays for the guarantee, and the claim is later found to be unsubstantiated, the surety may be unable to recover the amount paid. These factors that undermine the hedging provided to the owner by performance bonds are counterbalanced by another, very important element: Bonding capacity of the contractor, i.e., the amount for which sureties will be willing to guarantee a particular contractor for. For every claim between the owner and the contractor that reaches the surety and requires its intervention, the bonding capacity of the contractor is severed. Since performance bonds are required by almost all contracts (public and private) today, such an event can practically result in the contractor going out of business.

The penal sum for performance bonds is usually 100% of the contract value, and this amount constitutes an upper limit for the surety's liabilities. In the case of contract breach, the exact amount of the penal sum is calculated as the cost of the terminated portion of the contract less any unpaid contract balance, plus any liquidated damages incurred already.

Even in the presence of all three types[4] of bonds discussed, construction contracts cannot account for all the complexity involved in a construction case, and the responsibility of settling such situations is transferred to courts. Other contract clauses, such as liquidated damages discussed in the next section, also attempt to provide hedging to the owner in the case of breach of the contract. As will be seen, however, they can provide only partial hedging and in the case of contract termination, they could also possibly backfire against the terminating party.

3.4.5 LIQUIDATED DAMAGES

A "liquidated damages" clause is almost always present in a modern construction contract. Generally, the clause provides that the owner is to be compensated for unexcused delays in the completion of work. In the absence of a liquidated damages clause, the owner needs to prove (usually in court) the real damages suffered because of the contractor's performance.

This brings the discussion to the true rationale behind liquidated damages clauses. When the true damages suffered by the owner because of delays are difficult to assess (and most of the time, they will be difficult to assess), the owner and the contractor agree in advance on a reasonable estimation of those damages. This estimation is the liquidated damages due by the contractor to the owner for delays or other non-conformance to contractual obligations. They are usually focused on delays, and consequently are expressed in a dollar amount per day of delay.

Naturally, liquidated damages apply to those delays that are solely caused by the contractor. In a real construction situation however, delays can be seldom

[4] There are other, less common bonds also used in the construction industry: *Work Guarantee Bonds*, which are used to back up the owner's claim under a warranty given by the contractor and *Lien Discharge Bonds*, which guarantees that the surety will pay the obligee in case a lien is placed on the property.

traced back to a single cause. Usually, actions of either the contractor or the owner initiate further actions of the other party and more reactions, until matters escalate in substantial delays and breaches of the contract. In a snowball like such, it is very hard to identify the true reasons for delays and prove a unique applicability of the liquidated damages clause.

Liquidated damages are not a penalty or a threat to the contractor. They are only an estimation of the actual damages suffered. On the other hand, if a contract that contains liquidated damages clauses is delayed at no actual cost to the owner, the clause still applies and compensation is due. The owner does not need to prove actual damages in the presence of the clause. Inversely, if the actual damages are less than what the contract provides, the owner cannot claim them. Therefore, the liquidated damages clause is a binding agreement between the contractor and the owner.

The fact that the rationale of the clause is to assess and agree on a reasonable estimate enables courts to chose to enforce it at will. The factors that usually come into play are:

1. The intention of the owner in introducing the clause. If it can be revealed that the interpretation or usage of the clause was in the kind of a penalty or threat, then courts may easily not enforce it.

2. The degree to which the amount claimed is reasonable. Since the liquidated damages amount is an estimate of the actual damages, it must be proven that it was a reasonable estimate at the time it was made. Again, the reasonableness of the assessment may have nothing to do with the actual damages suffered, but must hold at the time the contract was signed.

Because of these two assumptions, in the case of contract termination for default, the clause may initiate very controversial outcomes. Liquidated damages can be judged to provide enough compensation to the owner in the case of poor performance. In that case, the court may judge a termination for default to be arising from bad intention rather than a measure to protect the owner's interests: The owner's interests can be assumed to be protected by the liquidated damages clause. In this case, termination may be wrongful, with all the adverse consequences such a ruling can have for the owner.

3.4.6 BIDDING

In principle, competitive bidding and the related procedures and rules are not relevant with contract termination. The main reason is that, during the bidding process, there exists no contract between the owner and (any) contractor. Contracts are established at the time of the award[5]. However, practical issues early in the bid process and court rulings that account for them may sometimes be relevant to contract termination. Moreover, issues that trigger breach and termination sometimes find root in the initial bidding process.

In the first case, termination is referred to as bid withdrawal, usually because of mistakes in the bid. Since the bid of any particular contractor is not disclosed to others, there is not indication other than the owner's estimate, as to whether a bid has a mistake or not. It is not uncommon that contractors win a bid because of a mistake they have made in calculations or assumptions. Usually, such mistakes are discovered at the bid hearing process or shortly after award of the contract. What happens if a bidder wins a contract because of a mistake?

The law used to be stringent on the matter. The contractor had no right to withdraw or alter the bid, if the mistake was not arising in any way from the owner. Circumstances have lead to the modification of the law in this matter. Courts will now allow the withdrawal or modification of a bid containing a

[5] For more information on the formal and legal aspects of contracting, see [22] and [26].

mistake, if certain conditions are met[6]. Perhaps the most important is that the mistake must be proven. The bidder alone is responsible for providing proof that the submitted bid contains an unintentional mistake and that a "mistake" was not "planted" in the documents for future use. The other relevant conditions are the following:

1. The bidder has made a *material* mistake in constructing its bid. That is, the mistake must make a significant difference in the final price(s) submitted.

2. The claimed mistake must be subject to objective determination, i.e., the nature and magnitude of the mistake must be demonstrable just by examination of the bid documents or *any* bid preparation documents.

3. The bid mistake must be clerical and not judgmental. Clerical mistakes include mistakes in calculations, oversights, misplaced decimal (e.g., copy $20,000 instead of $200,000) etc. Judgmental mistakes refer to misinterpretations of the specification documents, erroneous assessments and forecasting and assumptions.

4. The owner will unconscionably profit from the mistake, if the contractor is not allowed to withdraw the bid.

5. The owner's loss because of bid withdrawal is limited to loss of bargaining power, and nothing else. What else could the owner lose? If the claim for the mistake is made late, other than bargaining power the owner loses also time and money from the delay.

6. The bidder's mistake must not be the result of gross or culpable negligence i.e., the mistake must not result from excessive carelessness or failure to

[6] The list is general, and seeks to convey the rationale of the decision rather than a full account of conditions.

obtain and understand all the documents, regulations, site conditions, specifications and plans relevant to the project.

Once a mistake has been proven, there are many different possible courses of action:

- The bid can be withdrawn (or, if a contract has been signed, the contract may be rescinded). In most cases, if the bidder is allowed to withdraw its bid, it is not liable for any compensation to the owner.

- The bid can be withdrawn if the parties have not entered into contract. This alternative is very similar to the previous one, with one difference: It is argued that since a contract has not been made, the withdrawing bidder is only in breach of its promise to enter a contract in case of an award. Then, the contractor is only liable for the amount of the bid bond, if one exists. Strangely enough, courts often overlook this alternative.

- The bid may be modified (again, if the contract has bee signed, the contract may be reformed).

- The bidder may waive its right to withdraw or reform the bid, usually by keeping silent about the mistake.

An important detail, relevant to termination, governs the third alternative. The contract may be reformed to reach a corrected value, only if this corrected value is lower than the second lowest bidder. If correction of the mistake results in a contract price higher than that, the only alternative to the bidder is to withdraw the bid. If the owner and the contractor have entered into contract, the only alternative is the termination of the contract.

Whether termination in this case is rightful or not depends on the circumstances under which the mistake was discovered and how it was characterized. In any case, termination of a contract in such situations may be risky for the owner. Depending on the timing the mistake was discovered the other bids may not be valid, and the owner will always lose bargaining power as well as time and money for re-opening the bid. Finally, the mistaken contractor may suit against the owner for wrongful termination, which will prove costly for the owner in the end.

To avoid mistaken bids, the law provides that the owner has the duty to verify a bid in case of a suspected mistake. Furthermore, the owner is obliged to suspect a mistake and request verification from the bidder, if the questionable bid is substantially lower than the other bids or the owner's estimate. Finally, if the owner suspects a specific mistake, it has the duty to direct the bidder's attention to it and request confirmation of the bidder's intent related to the area in question. Although this owner's duty reduces the probability of a mistake being discovered after award of the contract, it also relieves the contractor of some of its responsibility on the correctness of the bid.

The bidding system and relevant legislation provides an equally vague and risky legal terrain for the case of termination, as the other frequent clauses mentioned here. These practices should govern the decision-making procedures and models for contract termination. Also, the legal ambiguity and complexity inherent in cases of termination should mean that legal advice is necessary for both parties involved, and before any decisions are made. Nevertheless, the decision to terminate requires managerial and engineering, other than legal expertise.

Chapter 4 MONITORING FOR CONSTRUCTION CONTRACT CANCELLATION

4.1 INTRODUCTION

The source of all evil, when evil is contract cancellation, is the misalignment of the involved parties' interests. Construction projects involve several entities depending on the delivery system followed, each with their own primary objectives and expectations from the project (Table 4.1-I).

TABLE 4.1-I: OWNER - CONTRACTOR OBJECTIVE ALIGNMENT (FROM [19])

Contractor's Objectives	• Achieve profit and other financial gains • Satisfy client and generate repeated business • Manage cash flow • Limit long term liability • Develop employees and create internal satisfaction • Optimize employment level within contractor organization
Contractor's And Owner's Objectives	• Complete the project within budget • Complete the project within schedule • Maintain a high level of quality • Execute the project safely, without wasted time or accidents • Minimize claims and litigation
Owner's Objectives	• Meet return on investment goal • Minimize plant operating and maintenance costs • Achieve high product quality • Achieve high product throughput capacity goals • Provide design flexibility to meet future demands • Minimize disruptions to existing operations • Avoid negative impact on environment and community • Reduce project cycle time • Exceed internal customer's expectations

Observe that, although some goals are shared between the contractor and the owner (e.g., to minimize claims and litigation & to complete the project within schedule and budget), overall, their goals are quite different and in some cases, incompatible. These different goals may generate conflict, which may even lead to litigation, depending on the delivery system and the contract type used. Table 4.1-II summarizes the types of relationships for four common delivery methods: Design-Bid-Build (DBB), Pure Construction Management (PCM), Construction Management at Risk (CMR), Design-Build (D/B).

TABLE 4.1-II: RELATIONSHIPS AMONG PARTICIPANTS

	Owner	Contractor	Engineer	CM	
Owner		Contract	Contract	Contract	PCM
Contractor	Contract			Unofficial	
Engineer	Contract	Unofficial		Unofficial	
CM					
	DBB				

TABLE 4.1-III: RELATIONSHIPS AMONG PARTICIPANTS

	Owner	Contractor	Engineer	CM	
Owner		Contract			D/B
Contractor			Internal		
Engineer	Contract				
CM	Contract	Contract	Unofficial		
	CMR				

Table 4.1-II and Table 4.1-III indicate which contractual relationships might be breached. In a traditional design-bid-build system, the engineer usually holds a fiduciary relationship with the owner. The misalignment of interests is apparent between the contractor and the owner, and the potential for conflicts and/or contract breach lies exactly there. Traditionally, it is the engineer's responsibility to act as an intermediate party to these disagreements, without binding either the contractor or the owner to the proposed solution (Figure 4.1-1, adopted from [19]). Following unsuccessful determination by the engineer, the parties resolve conflicts through binding arbitration[7]. The effectiveness of the engineer to resolve conflicts of interest and align

[7] Arbitration is performed by various parties, depending on the contractual conflict resolution clauses. The arbitrator may or may not be the engineer.

objectives is nevertheless undermined with the size of the project, the dollar amount involved in disputes, and the engineers' own tendency to become part of the dispute (by developing fiduciary relationships, often with the owner). The other delivery systems, CMR, D/B and PCM are not significantly better in aligning the objectives of involved parties or providing the ground for their resolution. Therefore, construction under these systems is equally prone to allowing disputes to emerge as in the traditional DBB.

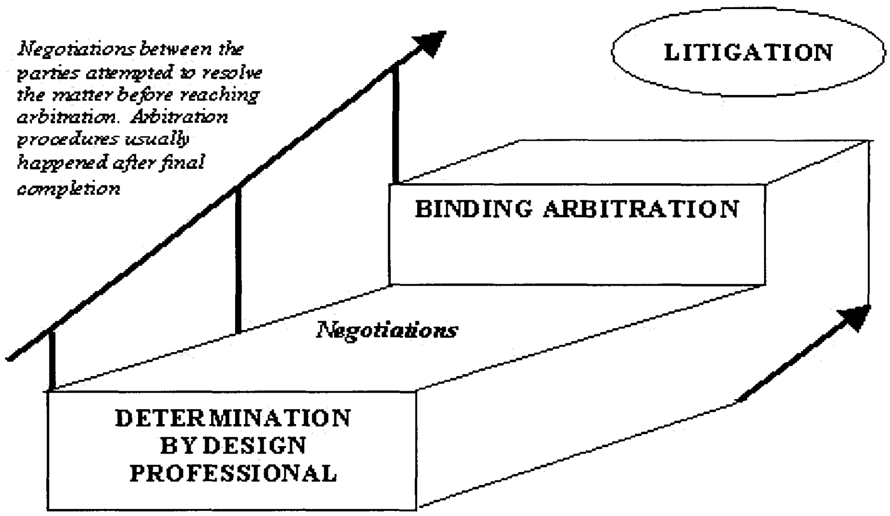

FIGURE 4.1-1: TWO-STEP CONFLICT RESOLUTION

Disputes are the starting point of some cancellations which arise from the alleged contractor's non-conformance to the contractual requirements. In other cases, contracts are cancelled for the convenience of the owner. With one exception[8], termination for default of the contractor and for convenience arise from different circumstances. The former are associated with contractor-specific reasons, while the latter are associated with the entire project's standing in its ecosystem. It is convenient to study the two cases completely

[8] See Section 3.2.3: Wrongful terminations for default may be "converted" to terminations for the convenience for legal purposes. This is a legal complexity, which can affect the actual evaluation for termination, see Chapter 6.

separated, but they are not always so. The microscopic performance measures determine the overall attractiveness of the project, and vice-versa, the macroscopic project ecosystem diffuses into everyday contractor performance.

4.2 TERMINATION FOR DEFAULT: DRIVERS

As mentioned above, the drivers for default termination are related to costs the owner will have to incur because of the contractor's performance. These costs change over time, as the contractor's performance adheres to the contract or not. Otherwise, there would be no contract in the first place. These costs are associated with the project ecosystem (Figure 4.2-1): Quality & performance, time & schedule, Cost & Budget, Sociopolitical context and Natural environment. However, contractor-specific drivers for termination for default are more often related to cost, quality and performance.

Changes in each of the factors of the project ecosystem can provide reasons for contract cancellation. Furthermore, dynamic relations between the factors of the ecosystem, such as the delay time in monitoring or reporting information, scan also create conditions favorable to cancellation. Table 4.2-I provides a list of factors or states of the project ecosystem that could provide indication of conditions that favor or oppose contract cancellation.

FIGURE 4.2-1: THE PROJECT ECOSYSTEM PROVIDES REASONS FOR CONTRACT CANCELLATION

The monitoring factors for default termination are essentially the same as the factors the owner or CM should monitor in order to defend claims against them. The differences lie in the significance and magnitude:

Most of the elements in Table 4.2-I, especially the ones that favor termination, refer to material breaches of the contract. The factors that oppose it are more related to the implications of termination on the project, the contractor and the owner.

Table 4.2-I also indicates that the owner should monitor elements of the project that may appear in court. These elements, namely the degree of completion of the project, the financial status of the contractor, the owner's conduct during the project towards the contractor's contractual performance, are important as they introduce high uncertainty for the owner. As analyzed in Chapter 3, in a complicated project ecosystem, it is fairly common that termination leads to litigation. In these cases, it is also common that the owner does not yield the expected benefits from termination.

TABLE 4.2-I: MONITORING FACTORS FOR DEFAULT TERMINATION

COST	• Significant cost overruns due to the contractor's performance, which the owner will bear based on the contractual agreement. • Unbalanced bid (discovered after the award of the contract). • Material mistakes in the bid, for which the owner can be made responsible or accountable, or mistakes that render the contractor not the lowest bidder. • Mistakes in specifications and owner-issued documents. • Any action of the contractor that increases the costs to the owner in the future or increases the risk of potential such costs, regardless of conformity to the contract. • Percentage of subcontracted work. • Internal financial status of the contractor, probability of bankruptcy. • The owner's conduct during the project in relation to the events mentioned above. • The uncertain costs of litigation deriving from termination. • The cost and availability of other contractors who may take over. • Financial state of subcontracts under the main contract and contractual obligations of the owner against them.
SCHEDULE	• Significant non-conformance to the schedule, with little hope of conformance in the future, corresponding to large costs to the owner. • Critical delays for which the contractor, subcontractors, material suppliers or labor unions are directly responsible. • The owner's interference and responsibility for delays. • Excusable/non-excusable, Compensable / non-Compensable delays • Unforseeability of critical delays • Percent of completed and paid work under the contract. • Liquidated damages clauses in the contract. • The owner's conduct during the project in relation to the events mentioned above. • The availability of other contractors who may take over the works. • Schedule progress of subcontracts under the main contract and contractual obligations of the owner against them.
QUALITY	• Significantly lower quality, with irreversible effects, affecting the usefulness of the project. • Unique technical expertise of the contractor. • Internal financial status of the contractor, probability of bankruptcy. • Contractor commitment and cooperation. • Adversary Intent or Fraud: Once the courts have determined that a contract exists, they are bound to find that the contract imposes obligations of good faith, cooperation and fair dealing. • The owner's conduct during the project in relation to the events mentioned above.
NATURAL ENVIRONMENT	• Contractor's non-conformance to contract clauses prescribing environmental precautions • Contractor actually or potentially inducing unrecoverable damages to the surrounding environment.

The factors that drive termination for default are often subject to large uncertainties. These risks derive from insufficient understanding of the project ecosystem, unbalanced sharing of information between the contractor and the owner, uncertainty as to the evolution of the project in the future, and uncertainty as to the costs and benefits of initiating termination. These sources of uncertainties must be continuously accounted for, in a relevant decision model in order to be assessed properly. This is the subject of discussion in Chapter 5.

Closing the subject of monitoring for default termination, it is useful to mention that the monitoring effort should be coordinated in parallel with the standard contractual dispute avoidance and resolution techniques. The more staged this technique is, the better (Figure 4.2-2, adopted from [7]). As explained in Chapter 5, default termination is associated with risks which derive primarily from the outcome of the subsequent litigation. Figure 4.2-2 also explains that on higher "steps" of the ladder, flexibility and control over the final outcome of a conflict, alternative mechanisms to resolve a dispute and participation of the immediate project team are reduced, while the relevant expenses and hostility between involved parties increase. If termination is judged to be the only viable approach for default of the contractor, it is probably also the last resort of the owner. Nevertheless, it pays to try to coordinate the stages leading to termination with a dispute resolution scheme.

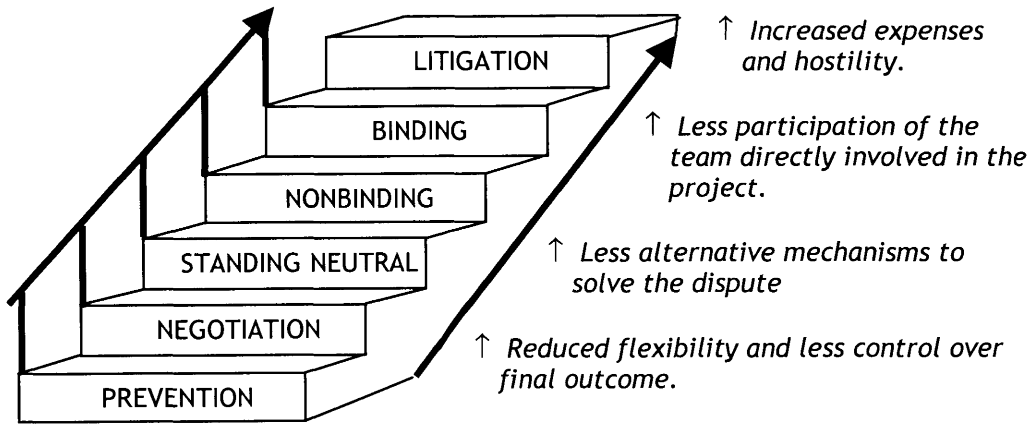

FIGURE 4.2-2: SIX-STEP DISPUTE AVOIDANCE AND RESOLUTION TECHNIQUE (DART)

4.3 TERMINATION FOR CONVENIENCE OF THE OWNER: DRIVERS

Termination for the convenience of the owner, in contradiction to termination for default, requires a different monitoring scheme. Monitoring does not need to be centered around the contractor's performance, but rather, around the entire project ecosystem throughout the project's lifecycle.

Termination for convenience is very similar to premature cancellation of research and development projects, analyzed in Chapter 2. The project is no longer seen in the narrow perspective of construction, but in the broader sense of a capital investment of long time horizon. In this sense, a contract or the entire project is subject to termination for convenience when the current assessment of costs and benefits from it has changed significantly since its conception or initiation. Again, the costs and benefits need to be defined broadly in relation to the entire project ecosystem. Their interpretation will differ between capital projects: A private corporate owner expanding its office facilities is likely to carry a different interpretation of costs and benefits than the public sector undertaking a major transportation project. Whichever the case, the organization needs to continuously monitor the factors that may render a project (or a part of it) undesirable in the long run.

The convenience termination clause, now always included in contracts, gives the owner an almost unlimited power over the fate of the project and consequently, the contractor(s). Moreover, as long as this power is not abused in bad faith, it is almost never questioned. The reason why this is not completely unfair for the contractor, is the significance of the factors that oppose termination for convenience. In the case of capital projects, these factors carry much more weight than for R&D projects and are subject to much less uncertainty. The main reasons capital projects are not frequently terminated are the following:

Capital investment is irreversible: Capital projects require dedicated resources such as land and non-reusable building materials. Because of this, commitment to capital projects is subject to very careful evaluation, planning and feasibility analyses: Structures are there to stay. Very seldom is it possible or financially plausible to "undo" a capital project.

The project ecosystem does not change dramatically: Often, the useful life (or the payback period) of capital projects is of a different timescale than their environmental impact. Therefore, unpredicted environmental effects usually do not change the project ecosystem during construction. This is not to say that environmental assessment studies are not relevant. Simply, the full environmental effects of most capital investments are not seen during their construction. The same is true of sociopolitical changes that projects may cause. For example, a residential building downtown is likely to bring profits regardless of minor changes in the social environment, and is unlikely to affect or be affected significantly by changes in the environment during its payback period.

Life-cycle flexibility and alternative uses: Some categories of capital projects constitute sustainable investments in a variety of social, economic and environmental contexts. The truth in this statement of course depends on the nature of the structure discussed and its architectural flexibility. However, it is unlikely that the sustainability of a structure will be easily undermined by small changes in its financial environment. A large spectrum of capital investments can find alternative uses in case their original plan proves unviable during their useful life.

In short, capital investments are subject to much less uncertainty than R&D projects, both with respect to their development as to their useful life. On the other hand, they are much more irreversible. Consequently, the planning and evaluation processes before initiation, even being less elaborate, are much more accurate than in R&D projects discussed earlier. As a result, termination for convenience is not caused for quite the same reasons, nor is it as frequent as in R&D projects.

Table 4.3-I presents a monitoring scheme for convenience termination of capital projects. The scheme attempts to cover most types of capital projects and most owner organization configurations. For this purpose, it is useful to broadly classify capital projects into one of the following categories:

1. **General purpose, flexible, convertible private infrastructure** (general purpose warehouses and industrial buildings, residential buildings, mixed office/residential structures etc.)

2. **Specialized inflexible private infrastructure** (food warehouses, air hangars, commercial/retail renovations or new construction, research laboratories, educational buildings, hospitals, hotels, clean rooms and other specialized industrial buildings, private roads)

3. **Public Benefit large-scale infrastructure** (electric power plants, waste treatment plants, pipeline & information networks, nuclear power plants, hydro-electric dams, transportation networks, airports etc.)

4. **Public Benefit small-scale infrastructure** (regional parks and public spaces, government organizations, firehouses, public sports facilities etc.)

These projects are different in various respects regarding termination. Apart from their impact on the environment, they are also different in their flexibility or change of use, commitment of capital, range & diversity of stakeholders, immediate and long-term economic value and strategic significance to the society. For each of these categories of infrastructure, some or all of the termination factors in Table 4.3-I apply.

TABLE 4.3-I: MONITORING FOR CONVENIENCE TERMINATION OF CONSTRUCTION (BASED ON [15])

Stakeholders' Characteristics
Encouragement Of Persistence
Social/Economic Profile
Political Pressures/Support
Long-term sustainability of the owner organization
Ability to commit to a project to its completion
Diversity of stakeholders' utility perceptions (multiple stakeholders)
Susceptibility change in stakeholders' perception of utility
Organizational Inertia

Project Evaluation and Design Factors
2a. Static Project Factors
Organization's prior experience
Irreversibility of the capital investment / materials & Land re-use
Design Improvements or prior design mistakes & omissions
Mistaken feasibility study
Mistaken initial budget
Scope related to the initial requirements
Embedded flexibility of the end-result
Alternate uses of the structure
Alignment of costs & Benefit time horizon
High Sunk Costs
Intermittent Rewards
Salvage And Closing Costs
Benefits At End
2b. Project Manager Factors
Persistence
Reinforcement Susceptibility
Confronting Mistakes
Information Biasing
Job Security
Political Pressures

Dynamic Project Factors
3a. Dynamic Project Factors
Review Project Evaluation and Design Factors:
Design Improvements or prior design mistakes & omissions
Mistaken feasibility study
Mistaken initial budget
Scope related to the initial requirements
Political Pressures
Alignment of costs & Benefit time horizon
High Sunk Costs
Intermittent Rewards
Salvage And Closing Costs
Benefits At End
Performance & Technology:
Difficulty Achieving Technical Performance (regardless of contractor)
Time To Completion Lengthening (regardless of contractor)
Missing Performance Milestones (regardless of contractor)
Dramatic changes in available technology or requirements
Sponsorship:
Project Less Consistent With Organizational Goals
Loss of Importance To The Owner
Loss To Management Commitment To Project
Economics:
Lower Project ROI, ROS, Market Share Or Profit
Higher Cost To Complete Project
Less Capital Availability
Longer Time To Project Returns
Missing Project Cost Milestones
Reduced Match Of Project Financial Scope To The Organization
Sociopolitical & Natural Environment:
Better Alternatives Available
Increased Government Restrictions
End-Users/Stakeholders
Market Need Obviated
Market Factors Changed
Reduced Market Receptiveness
Decreased Number Of End Use Alternatives
Reduced Likelihood of Successful Commercialization
3b. Review Stakeholders' Characteristics
Evaluate Interactions And Progress Of Factors In Steps 1 and 2b

As mentioned above, not all of the monitoring factors in Table 4.3-I apply for all projects. For example, public infrastructure (categories 3 & 4 in the list above) is more prone to changes in the stakeholders characteristics.

Nevertheless, the owner's organization should account for these factors during initial evaluation in order to assess the susceptibility of the project to convenience termination. However, that is not enough. Depending on the project's initial susceptibility, continuous monitoring for termination should take place.

4.4 MONITORING FOR TERMINATION: PROJECT AUDITS

This monitoring effort is not meant to be made on its own. Most often, by the time monitoring for termination is initiated, it will be too late: The result will be pre-determined or, in any case, biased. Rather, monitoring for termination should be embedded in the regular monitoring instruments followed by the owner or the project manager during development. These instruments, namely project audits, should be configured to track these termination factors if a project is judged to be susceptible to termination from the beginning. To close this chapter, a brief description of the logistics of audits as monitoring instruments follows.

A project audit is the practical means of investigating in depth one particular aspect of a project, or the entire project ecosystem. Their purpose is to provide understanding for the project ecosystem, and insight into the effectiveness of the project management policies and decisions. Their scope often ranges from the strategic decisions and procedures on an aspect of the project, to their tactical and operational implications. The audit procedures are formal, and often clearly mandated by the party requesting an audit, so that the process serves its intended purpose. In what follows, the concept, the characteristics and benefits as well as guidelines for implementation of project audits will be presented.

Project auditing is a powerful tool for tracking, learning about, and improving project performance, however, it is costly both in terms of money and time. Because of this, project audits are seldom conducted according to a regular schedule. In practice, they are often encountered as post-mortem evaluations (i.e., after the project is over), or as investigations into elements of the project that have caused it to go awry.

Organizations like British Petroleum (BP)[8] have developed a "Post-Project Appraisal department (PPA)", responsible for evaluating selected projects after their completion, if they are convinced that the audit can provide lessons to the organization. A typical evaluation is very comprehensive: It looks into the life cycle of the project from the initial proposal till two years after it is operational. It is also very costly: The completion of a PPA for large investments lasts about six months. Great effort has been put into communicating the lessons learned from PPA to top and regional managers in BP. The organization has benefited greatly from PPA's, making the department an integral part of its planning and control processes.

Some circumstances make audits necessary during the development of projects. This is often the case for large projects that run into trouble. Such a comprehensive review can reveal reasons that caused trouble, which might not be so obvious to any single team in the organization. Finally, the extra cost of holding regular audits can sometimes be justified as a proactive measure, a learning opportunity for "things done right", or as a means for monitoring advances and changes in the organization. A regular auditing scheme can be devised to monitor the implementation of the infrastructure (i.e., communication hardware and software) or organization for a global concurrent design project. Regular audits can be suitable for monitoring the long-term absorption of a new technology in standard organizational practices. Finally, audits can be configured to provide opportunity of evaluating a project from a perspective of early termination.

Project audits are evaluations of project performance, conducted through investigation in a prescribed depth and scope, at pre-determined time intervals in the lifecycle of the project, if circumstances call or at the end of it. The product of an audit is a report, which includes the findings of the process and relevant conclusions. Audits make a "cross-section" of a project in time and look into the management, the methodologies, the procedures, the records, the budget, the expenditures, the performance and the degree of the project completion up to that point.

Audits are not merely a collection of data coming from the process of monitoring the project. Their scope extends to "digging into" qualitative information as well as abstract features of the project, such as the efficiency of the management organization. They are not supposed to result in just a report of quantitative facts about some aspects of the project, but to provide a complete and comprehensive account of the project status and success, as well as useful lessons for the future. Since "success" can only be defined with respect to a goal, the auditing process must reflect that.

It is important that auditing is seen as a comparison rather than a mere account of project activity. A reference base for this comparison has to be established at the beginning of the project and used for every auditing purpose during its implementation. To accurately and comprehensively measure performance and thus obtain meaningful results, both the base of comparison and the auditing procedure must be relevant, accurate, comprehensive and truthful. The relevance of the auditing scheme with the specific project is vital: Performance can be measured differently for different projects. In the case of evaluation for convenience termination, the audit should be configured to examine the project only with respect to the relevant factors in Table 4.3-I, and not all of them.

Chapter 5 DECISION SUPPORT FOR CONTRACT TERMINATION

5.1 INTRODUCTION

So far, Chapter 3 has dealt with the legal principles and contractual provisions governing contract termination in two standardized and widely used forms of construction contracts. Chapter 4 attempted to identify the drivers and monitoring factors for both termination for convenience and for default. In the former case, it is seen that the drivers are very similar to the ones governing research and development projects (Chapter 2), although the nature of the construction industry presents unique differences. In the latter case, the drivers for termination are uniquely dependent upon the contractual agreement and the traits of the industry. In both termination for convenience and for default, a monitoring framework was established, for gauging relevant and important factors.

Utilizing this framework requires that every time it is used, a decision for termination is made. This chapter goes through the decision models used for evaluating such decisions in other industries, their deficiencies and the ways they can be inappropriate (or at least, not optimized) for the construction industry. Alternative approaches to these methods are proposed, based on the evaluation and decision models available in the literature.

5.2 RETROSPECTIVE DECISION MODELS FOR R&D PROJECTS

"Retrospective" decision models are widely used to evaluate the option for termination of research and development projects. They involve fairly simple analytical procedures, and the most advanced rely heavily on statistical information of similar past projects with regard to the matters of concern for the current venture. Hence their name.

"Retrospective" decision models are based on measurements or estimates of the current status of the project in relation to termination factors (such as those in Table 2.3-I, page 23), and intuitive (most of the time) prediction of the evolution of these factors in the future. A "score" of the project with regard to each of those factors is assigned based on management's judgment, intuition, experience and, in advanced frameworks, statistical evidence. Also, the importance of each of these factors is taken into consideration, by assigning a "weight coefficient" to each. The factors need not be expressed in explicit units (monetary value or time) - an arbitrary scale suffices. They can even take a Boolean form, such as "yes" or "no" answers.

Theoretically, these models fall under the "weighted sum" methodology of evaluation of alternatives. The methodology relies on the existence of some "absolute scale of evaluation," which has the potential of carrying all the information about the value of each alternative. The alternative courses j, in this case are two: The termination of a project ($j \equiv t$) or its continuation ($j \equiv c$)[9]. Appropriate termination factors (e.g., in Table 2.3-I) can be regarded as viewpoints, from which each alternative can be evaluated. Let there be n factors (or criteria). Then the evaluation of each alternative for each of the criteria, i, is

$$\text{Score of alternative } j \text{ on criterion } i = g_i(j)$$

The score for each criteria g_i must of course be expressed in the same scale, otherwise the comparison among criteria is impossible. This implies some sort

[9] More alternatives can be added potentially, involving the continuation of the project up to some point in the future and its termination then. These alternatives are not considered here.

of normalization of these scores. For instance, if the maximum imaginable score on "profitability" is the expected profit of the project in dollars $g'_{i,\max} = \$10{,}000$, and the current score of the project is $g'_i = \$6{,}400$, then $g_i = \frac{g'_i}{g'_{i,\max}} = \frac{6{,}400}{10{,}000} = 0.64$. Further, defining the relative weight of each of the n criteria as k_n, where the relative weight represents a trade-off[10], the evaluation of each alternative for all the criteria will be

$$\text{Value of Alternative } j = V(j) = \sum_{i=1}^{n} k_i g_i(j)$$

Given $V(j)$ for every j, the decision maker is in position to evaluate the optimal alternative. Of course, the decision maker will first need to assess (1) the score of each alternative with respect to each criterion, and (2) the weight of each criterion in the final value. As mentioned above, these values are assigned based on management's judgment, intuition, experience and, in advanced frameworks, statistical evidence. The determination of these values for pre-established sets of termination factors is the current direction of relevant research, based on statistical evidence of past projects.

A similar approach consists of evaluating the "score" of continuing a project as the only alternative, based on a predetermined set of criteria. The scores of previous similar project that have either succeeded or failed are used to determine a "cut-off" value. The score of the project under evaluation is then compared to this "cut-off" value. If the score is below the cut-off score, then the project is thought to be likely to fail.

[10] The significance of the trade-off is expressed as follows: To compensate for a disadvantage of k_i units on criterion j, you need an advantage of k_j units on criterion i.

A statistical procedure, namely Discriminant Analysis[27],[2], can be utilized to help derive fair weight factors and cut-off scores. Computationally, the procedure is similar to multiple regression. A sample of projects for which a decision has already been made is selected, and the scores are evaluated for these projects. Using this data, the procedure determines appropriate weight coefficients for each factor, so that the discriminant score of the project in question is very likely to provide a correct estimate of its success or failure, and therefore a decision on whether to terminate it or not. The method still has weaknesses though. It assumes a universal discriminant function, otherwise the projects cannot be comparable, but this is unrealistic when it comes to certain success factors. However, even with this data, the evaluation of the g_i functions is left to the discretion of the decision maker.

5.2.1 EXAMPLE

For instance, assume the development of a new cosmetic hand-cream by a small pharmaceuticals company. The product developed is based on synthetic substances as opposed to the company's other products, which are 100% natural. Management also found out recently that an international firm is planning the release of a similar product in the same market. In the light of the technical difficulties the R&D department is facing and the subsequent schedule overruns, management is now wondering whether cancellation is more appropriate than persistence. To support their decision, they have developed a model (Figure 5.2-1), and they compare the success value of the project to the values of other products developed in the company in the past.

	A	B	C	D	E
1	#	Criteria	Success Value	Weight Factor	Weighted Success Value
2	1	Probability of commercializing results	9	30%	2,70
3	2	Higher priority of other projects	2	12%	0,24
4	3	High return on investment	7	20%	1,40
5	4	Negative effects on other products	1	5%	0,05
6	5	Change in support of project management	1	8%	0,08
7	6	Deviations in time schedules	1	10%	0,10
8	7	Strategic importance	10	15%	1,50
9				100%	6,07
10					

FIGURE 5.2-1: COMPUTATION OF THE SUCCESS VALUE OF A PROJECT (EXAMPLE IN MS EXCEL)

The discriminant model they used weighs the termination criteria management regarded as important, according to their perceived significance. The weight factors they chose sum up to 100%, but that was not necessary. Alternatively, they could have quantified the factors in relative terms, with a value greater than 1 if the factor has "increased" since last reviewed or less than 1 otherwise. A "sum of the products" (SUMPRODUCT function in Excel) of these values with the importance factors provides a weighted estimation of the "success value" of the project - 6.07 in this case.

5.2.2 RELIABILITY & APPLICABILITY ISSUES/CRITIQUE

Proper usage of the weighted sum decision model (and its discriminant variant) relies heavily on some strict assumptions:

1. **Evaluations on all scales are cardinal**, meaning that they are numbers and their values are used as such even if they result from normalizing ordinal data.

2. Equal differences between values on scale i, whatever the location of the corresponding intervals on the scale, should produce the same effect on the overall evaluation $V(j)$. In other words, **each scale is assumed *linear*.**

3. **Weights represent trade-offs**: Transforming the linearized scales results in a related transformation of the scales.

4. Criteria do not interact - **additive independence applies.**

Because of these assumptions and other reasons, the class of evaluation models described above has inherent drawbacks, the most important of which are summarized below.

1. **Flexibility**: In practical applications, projects are evaluated on different criteria, because different circumstances are significant each time. The discriminant models discussed above assume a single set of criteria however. If the important set of factors for the project under evaluation is a subset of the pre-determined factors of the model, then the redundant elements will be eliminated through the statistical screening. If, on the other hand, there exist factors that are not included in the discriminant model, then comparison becomes unreliable.

2. **Stability**: The weighted sum model is very dependent on the initial set of alternatives due to the normalization process. If $g'_{i,\max}$ changes without any change in the values of the weights, then the changed set of normalized values for each alternative may cause a rank reversal between alternatives.

3. **Arbitrary coding of non-quantitative data:** The way non-quantitative data is coded in values is straight-forward but arbitrary.

4. **Linearization of Scales:** An inherent drawback of the weighted sum method is the assumption of a linear normalized scale. This is often not true: If the earliest possible completion of a project (say, a hotel) is in April and the latest possible is in June, then the benefit from accelerating the project from June to May (before the summer season starts) is much larger than the benefit from accelerating completion from May to April.

Unfortunately, these characteristics of the weighted sum-based models make them worse than just one first approximation to the optimal decision alternative; these models are, for the most part, unreliable and wrong. Two approaches have been followed to overcome the drawbacks of the weighted sum method: (1) the construction of *multi-attribute utility functions* and (2) the *outranking* family of approaches.

This text discusses the first approach as more appropriate for the evaluation of construction contract cancellation.

5.3 EVALUATION FOR CONTRACT TERMINATION USING DECISION ANALYSIS

This section aims to build an evaluation methodology for construction contract termination, either for convenience or for default. The methodology applied is formally not new in the evaluation and decision analysis literature. Due to the unique features of the construction industry, it is believed however that it is more flexible and more suitable than evaluation and decision models used in R&D projects.

The proposed methodology is formal decision analysis using multi-attribute utility functions. Decision analysis lifts some of the drawbacks of the previously mentioned models and provides more flexibility in the modeling and decision process, which may be useful in a construction context. Furthermore, it is associated with numerous other benefits which will be discussed in the closing of this chapter.

The basic premises on which this methodology builds on are presented next. They are essentially assumptions related to the preferences and behavior of owners of capital projects. The methodology itself is explained next. The chapter closes with a conclusion and critique of the proposed framework.

5.3.1 ASSUMPTIONS & MODEL PREMISES

As mentioned in Chapter 4, termination drivers arise from every element in the project ecosystem: Cost, Schedule, Quality, Natural Environment & Sociopolitical Context. Apart from termination drivers, these five elements also provide the measures for the attractiveness of a project or an individual contractor. Before they are entered into a model, these elements must be precisely defined:

- **Cost** = The total expenditures associated with a particular alternative. These may include as appropriate: Direct construction costs, litigation costs, opportunity costs, cost if capital and others. Costs are to be minimized.

- **Schedule** = The time to complete the project, which is also to be minimized.

- **Quality** = A measure of the quality of construction. Different measures for quality apply to different works, and confining them at this point is not appropriate (or useful, because of the wide variety of definitions for quality, depending on the specific project). Quality, in any case, is to be maximized.

- **Natural Environment**[11] = A measure of the direct effects of an alternative on the natural environment. Depending on the project in hand, the goal may be to maximize them or to minimize them. Usually, it will be the latter.

- **Sociopolitical Context** = The beneficiary effects of the project on the sociopolitical environment. Notice the role reversal from Chapter 4: The sociopolitical context is not viewed as a factor affecting project performance here, but rather, as an environment to be affected by it. For public organizations usually, this factor can be an important decision

[11] For the natural environment and socio-political context, it is assumed that the owner has a direct interest in these two elements, therefore, the value functions for these attributes do not need to be determined from the collective decision-making behavior of other entities.

variable. In any case, it is important not to confuse the impact on the sociopolitical context with the direct costs of the project, when evaluating termination decisions.

These are the elements of value (or *attributes of alternatives*) for the owner, which enter the decision model developed. In order to account for the different units these attributes may be expressed in, and for the non-linearity in the preferences of the decision-maker (i.e., the owner, see also Section 5.2.2), the level of each attribute has to be converted into a utility.

The means of deriving to the utility functions of the decision maker are beyond the scope of this text. Nevertheless, it is accepted that these functions will be non-linear, and more often, show risk-aversion. Double-convexity utility functions are also acceptable within this framework, and common in construction. For example, Figure 5.3-1 shows a possible utility function for the completion time of a major hotel.

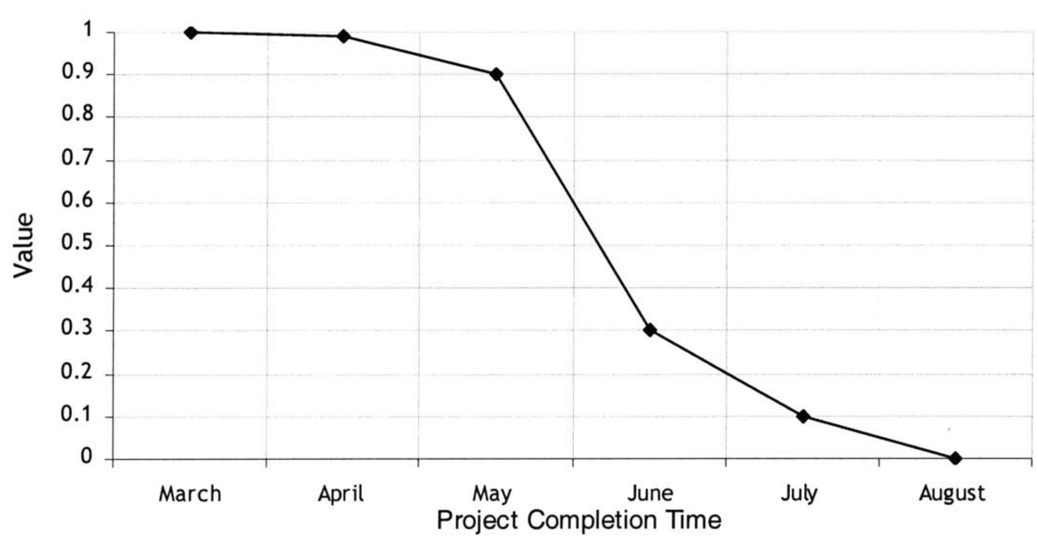

FIGURE 5.3-1: HOTEL OWNER'S UTILITY FUNCTION FOR THE TIME OF COMPLETION OF A PROJECT (NORTHERN HEMISPHERE, SUMMER RESORT)

Two basic assumptions govern the validity and applicability of the discussed methodology, and they are related to these elements of value.

1ST ASSUMPTION: PREFERENCE INDEPENDENCE APPLIES

This means that if two alternatives share the same value for one of the attributes, then, changing the level of the shared value should not change the ranking (or relative preference) of the two alternatives. Note that the same assumption exists for the weighted sum model (see Section 5.2.2).

2ND ASSUMPTION: UTILITY INDEPENDENCE APPLIES

The assumption of utility independence states that preference between a lottery and a certainty equivalent for one attribute x_i does not depend on the levels of the other attributes x_j. Symbolically,

$$\begin{aligned}&\text{if}\\ &x_i \sim (x'_i, p; x''_i) \text{ for one set of } x'_j,\ j \neq i\\ &\text{then}\\ &x_i \sim (x'_i, p; x''_i) \text{ for all levels of } x'_j,\ j \neq i\end{aligned}$$

This assumption holds most of the time, when the first assumption holds. The two assumptions stated imply that the utility function of the owner will be of the form

$$KU(\mathbf{x}) + 1 = \prod_{i=1}^{n} \left(Kk_i U(x_i) + 1 \right)$$

For two attributes, the equation above simplifies to

$$\begin{aligned}&u(x_1, x_2) = k_1 u_1(x_1) + k_2 u_2(x_2) + k_3 u_1(x_1) u_1(x_1)\\ &\text{where } k_3 = Kk_1 k_2\end{aligned}$$

The factor K expresses the interaction between attributes, i.e., the degree to which the existence of two attributes simultaneously adds larger value than the sum of values from the existence of each attribute separately. K can be computed from

$$K+1=\prod_{i=1}^{n}(Kk_i+1)$$

Observe that, for $\sum k_i = 1.0$, $K = 0$, which leads to the simple additive model:

$$U(\mathbf{x})=\sum k_i U(x_i)$$

This simple model is perfectly valid when another condition also holds: That of *additive independence*. Additive independence may be hard to prove in the case of termination of construction contracts. Indications for its validity come from the existence of liquidated damages clauses in contracts, according to the letter of which, the owner is able to determine a monetary value for each day of delay on the project, so that it is indifferent between the timely and delayed completion. The claim that an owner may be indifferent between a GMP and a unit price contract for a particular project also supports this assumption. If additive independence truly holds, then the owner's utility function (for two attributes) further simplifies to:

$$u(x_1,x_2)=k_1u_1(x_1)+k_2u_2(x_2)$$

For this discussion we will assume that additive independence does not hold. To illustrate, we are saying that, for an owner, delivering on time and under budget has much greater value than the sum of values from only delivering on time or only delivering under budget. In reality, this issue remains to be examined, but as it will not affect the rest of the discussion, we will follow the general formulation above.

Having established these basic assumptions and framework, using multi-attribute utility analysis for evaluating construction contract termination is almost trivial. What is not trivial, but is outside the scope of this work, is the determination of the owner's utility functions with respect to the attributes mentioned above: cost, schedule, quality, social impact and the natural environment.

5.3.2 DECISION-MAKING FOR CONTRACT TERMINATION

A formal decision analysis framework can now be used to evaluate contract termination. Organizing a complete model and arriving at a decision will be illustrated by an example in the next chapter. In this section, the rationale of the decision analysis framework is presented by means of an influence diagram.

Influence diagrams are an alternative way of representing a decision tree. It does not contain the same information (at least as a schematic), but it provides better communication of the problem's structure.

In influence diagrams, decision nodes are represented by squares, chance nodes are represented by ovals, and end nodes are represented by diamonds. Double oval nodes denote variables in the model (probabilistic or deterministic). The arcs between nodes indicate one or more of three possible relationships:

1. A probabilistic influence, for which different possible outcomes at the first node require different enumerations of the probabilities on the second

2. A value influence, for which the value of a node (cost or profit, for instance) differs based on the outcome of another node,

3. A structural influence, which symbolically denotes some way of asymmetry in the corresponding tree.

The influence diagram shown in Figure 5.3-2 is created to assist policy design during some phases of the six-step DART framework (Figure 4.2-2). This gives the model a time dimension and, in a realistic situation, can even provide guidance for effective negotiations. Some termination factors for default have also been included in Figure 5.3-2 to show the relation of the decision-making process with the monitoring phase.

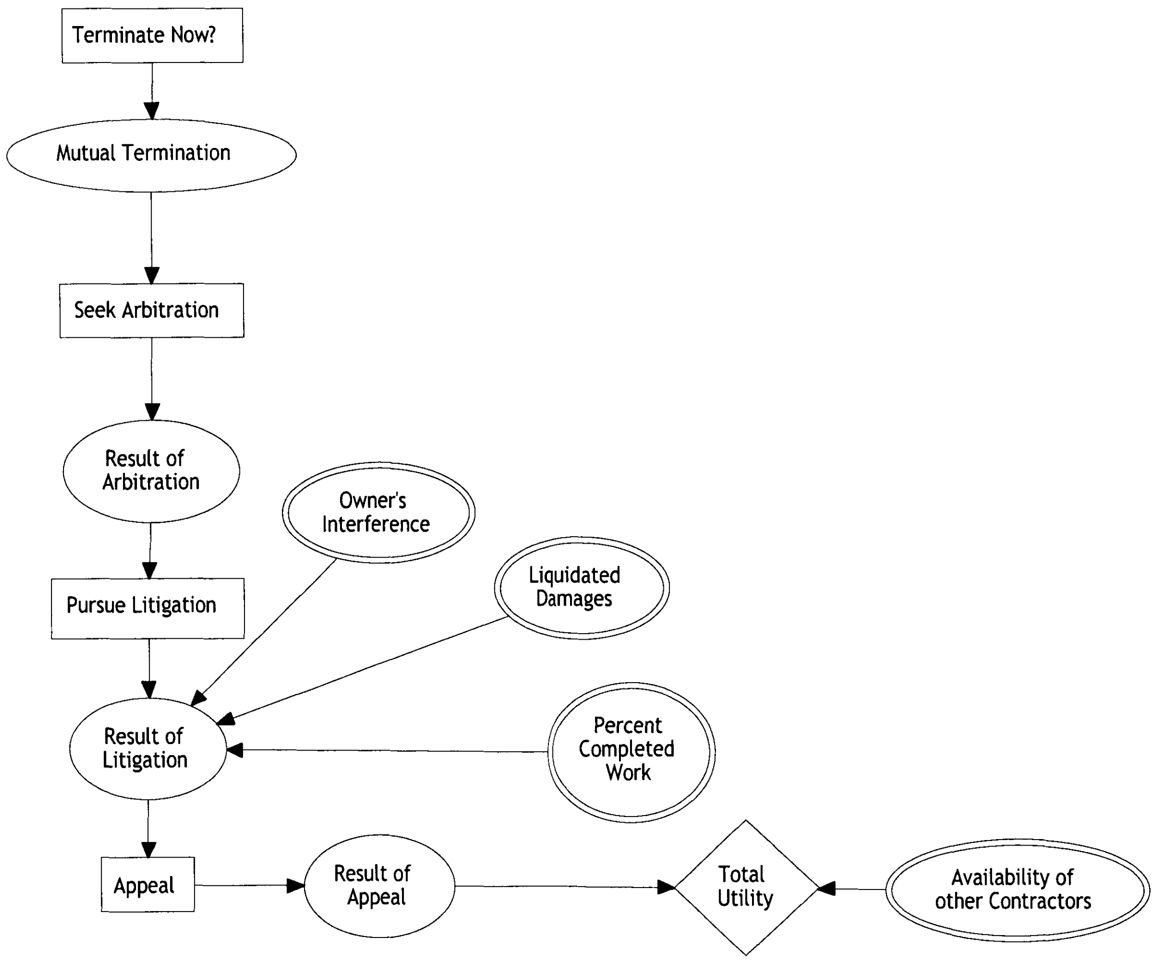

FIGURE 5.3-2: INFLUENCE DIAGRAM EXAMPLE IN TERMINATION FOR DEFAULT

5.4 CONCLUSIONS & CRITIQUE

Arriving at the optimal evaluation models for contract termination, several other decision and evaluation models were considered:

1. Thomas Saaty's Analytic Hierarchy Process (AHP)[21]
2. The weighted sum method
3. Outranking Methods
4. The additive value model
5. A simple real options approach

Multi-attribute utility functions with decision analysis was selected in the end, as the best approach for the problem in hand. This choice was not made from a mathematical or decision analysis viewpoint, but from a project manager's or an owner's standpoint. It was selected because it is thought to better capture the complexities of construction contract termination, while being flexible to adopt to the diversity of practical situations. A brief account of the reasons why decision analysis is thought to be appropriate for contract termination follows:

- **Non-linear preference & utility functions:** Construction owners will typically show high non-linearity in their preferences and utilities. In most occasions, cost- and schedule-associated utilities will even show double convexity, while quality, environmental and sociopolitical utility functions will often exhibit risk aversion.

- **Interaction:** The general multi-attribute model allows extensive interaction between utility functions. This feature allows the modeler to capture project-specific factors and account for them in the model.

- **Clarity:** Decision analysis is fairly easy to present and comment on. Mistakes and assumptions are communicated more easily than in the other methods.

- **Time Dimension:** Decision analysis assumes a specific sequence of different decisions and "events of nature," which, apart from being close to practical situations, permits the owner to weave the decision-making process with other elements of construction practice, such as dispute resolution and avoidance techniques.

- **Communication:** The decision to terminate is an inter-disciplinary one. It requires the input and direction of the owner representative, the engineer, the project manager and a legal and financial advisor. This method facilitates communication on the decision model and parameters between stakeholders or members of the owner organization. A decision model allows the expertise of the involved stakeholders to be easily mapped, giving the decision makers the flexibility of examining its potential courses of action formally and from different perspectives.

- **Learning:** Building a model also provides insight into its structure and allows learning about the project. Even if the model itself does not prove to be useful, building the model alone constitutes an invaluable learning process.

- **Sensitivity Analysis:** Decision analysis allows for extensive sensitivity analysis on the results, which increases their robustness and collective appeal within the organization.

- **Policy Design:** The clarity and embedded time dimension of the model, as well as the potential incorporation of a variety of factors from the entire project ecosystem allows the decision makers to design effective policies.

On the other hand, one of the major drawbacks of full decision analysis, especially in this context, is its complexity and lack of "automation." The models used in R&D projects are, for the most part, easy and fast to implement, providing an "automatic" decision support system. The increased accuracy and flexibility of decision analysis builds on increased complexity and requires experience on behalf of the decision-maker. Finally, it is sensitive to a variety of input parameters, such as the owner's utility functions which are not discussed here. Most of these parameters are difficult to obtain in a systematic and reliable way, thus making the method less reliable itself.

Chapter 6 A CASE STUDY: MORRISON KNUDSEN CORP. V. GROUND IMPROVEMENT TECHNIQUES INC.

6.1 INTRODUCTION

In this last Chapter, a case study of a terminated contract between a contractor and a subcontractor is presented. A preliminary and extendable decision model is built for the case, using the framework and methodology prior established. For lack of extensive information on the case the analysis aims to present a possible applicable framework for termination factors.

Morrison-Knudsen Corporation (MK), a federal contractor, terminated its subcontractor, Ground Improvement Techniques (GIT), for an alleged default, and sued GIT for damages. GIT counterclaimed for wrongful termination. GIT's claimed damages included payment for completed work under the subcontract, equitable adjustments to the subcontract price for increased costs caused by MK, damages claimed by lower-tier subcontractors, and attorney's fees. MK unsuccessfully moved for judgment as a matter of law, claiming insufficiencies in GIT's evidence of damages and of MK's liability. A jury found the termination wrongful and awarded GIT roughly half the damages claimed.

6.2 BACKGROUND

The United States Department of Energy hired MK in 1983 to manage its Uranium Mill Tailing Remedial Action (UMTRA) project, a cleanup of radioactive mill tailings at sites around the country. MK subcontracted with GIT in March 1995 to clean up the Slick Rock, Colorado, site. GIT hired several lower-tier subcontractors ("subs"), including R.N. Robinson & Son, for excavation; Bogue

Construction, for trucks; Keers Environmental, for asbestos abatement; and GA Western, for bridge work.

The MK-GIT Subcontract ("the contract") obligated GIT to complete the project by December 1996. The contract price was roughly $9.3 million. The contract incorporated almost verbatim several standard federal clauses for fixed-price construction contracts, including clauses governing terminations for default and convenience. It also incorporated by reference the federal regulations governing the compensability of contractors' costs in the event of a termination for convenience. The contract provided that the law applicable to government procurement would govern all substantive issues in any litigation.

The project did not go well. GIT and its subs encountered delays, difficulties, and increased costs. GIT attributed these to MK's defective specifications, failure to timely secure permits, rigid interpretation of specifications and safety requirements, and propensity to reject proposed work plans. During the contract's performance, GIT requested extra compensation and extensions of time because of delays to, changes in, and increased costs of the work which GIT attributed to MK. GIT's central theory is that its plan to complete the project before the deadline displeased MK, who could not then earn the maximum possible fees from DOE. MK, in GIT's view, thus sought to hinder and delay the work. MK, on the other hand, attributed the delays and increased costs to errors, omissions, and delinquencies by GIT and its subs.

In September 1995 MK terminated GIT for default. The contract allowed MK to do so if GIT was not prosecuting the work with a diligence that would ensure its timely completion. MK simultaneously sued GIT for damages caused by its alleged default. While requiring GIT to cease work and vacate the site, MK also directed it to perform certain cleanup work and leave certain equipment behind. MK allegedly retained and used that equipment during the ensuing litigation. After the termination, MK denied almost all of GIT's requests for change orders to increase its compensation under the contract. MK also failed to pay GIT for various parts of the completed work and for the post-termination work and retention of equipment.

GIT protested the termination and urged MK to let it complete the project or bid on the re-procurement of the work. MK ignored these requests. In February 1996 GIT counterclaimed for wrongful termination, seeking damages in the form of payment for completed work under the contract and compensation for additional costs occasioned by MK and not contemplated by the contract.

Contemporaneously, the subs were demanding payment from GIT. After Keers filed suit, GIT settled its claims. At the time of the GIT-MK trial, however, GIT was still involved in litigation with Robinson and had not settled with or paid Bogue or GA Western. In its counterclaim, GIT also sought damages on behalf of the subs.

The district court eventually set trial for November 1996. In October 1996 GIT supplemented its pretrial damages disclosure, increasing the amount claimed from roughly $8.4 to $11.4 million and increasing the number of categories of damages. MK repeatedly but unsuccessfully challenged the supplementation, arguing that GIT had changed its damage theory just weeks before trial and was using previously undisclosed documentation.

Twelve days before trial, the court assigned the case to a new judge. That judge presided over a three-week trial, which focused on whether MK's termination of GIT had been wrongful. GIT presented one witness, its secretary/treasurer, Kip Cooper, to explain its damage exhibits and claims.

Before the court submitted the case to the jury, MK filed several motions for judgment as a matter of law under Federal Rule of Civil Procedure 50(a). MK made several challenges to GIT's damage evidence. It argued, inter alia, that GIT had not presented evidence of the types of damages allowed by the contract, or of causation, or of its attorney's fees. The court denied MK's motions. MK also argued in a jury-instruction conference that the contract barred GIT from recovering on behalf of subs whose claims GIT had not settled and paid. The court rejected MK's proposed jury instruction to that effect.

The jury found the termination wrongful and awarded GIT $5.6 million. MK then renewed most of its motions for judgment as a matter of law under Rule 50(b), and the court denied them again.

On appeal, the court of appeals rejected MK's challenge to the liability verdict but reversed the damage award. GIT's evidence of several of its categories of damages was insufficient, and its claims on behalf of its lower-tier subcontractors were premature, as GIT had not yet itself settled with all of its subcontractors. Because the jury returned a general verdict, the court of appeals could not determine whether any parts of the jury's award were for allowable categories of damages supported by sufficient evidence. Thus, it vacated the judgment and remanded for a new trial limited to the issue of damages.

6.2.1 APPLICABLE LAW AND CONTRACTUAL CLAUSES

The contract's default-termination clause, GP 56, incorporated essentially *verbatim* the standard federal Default clause for fixed-price construction contracts. That clause is part of the Federal Acquisition Regulation System (FAR). As incorporated in the contract, the clause allowed MK to terminate GIT if the work had been delayed, not for excusable reasons, but by GIT's lack of diligence:

1. If [GIT] refuses or fails to prosecute the work . . . with the diligence that will ensure its completion within the time specified in this Subcontract, including any extension . . . [MK] may . . . terminate [GIT's] right to proceed . . . .
2. [GIT]'s right to proceed shall not be terminated nor [GIT] charged with damages under this article, if the delay in completing the work arises from causes . . . beyond the control and without the fault or negligence of [GIT].

The clause further provided that a wrongful default-termination would be treated as a termination for convenience:

> 3. If, after termination it is determined that [GIT] was not in default or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

The contract's Disputes clause, GP 41, provides that "any substantive issue of law in [litigation concerning the contract] shall be determined in accordance with the body of law applicable to procurement of goods and services by the Government." According to this clause, and after the parties proposed different instructions for the jury for the interpretation of delays, the court decided that six elements of a compensable delay were required by GIT in order to prove that MK refused it the additional time to complete the project that a delay made necessary:

> GIT must prove each of the following elements :
> 1. GIT was delayed or accelerated in its performance;
> 2. The delay was beyond the control of GIT;
> 3. The delay was without the fault or negligence of GIT;
> 4. [MK's] conduct in causing the delay was not authorized by the subcontract;
> 5. GIT incurred additional costs as a direct result of the delay;
> 6. GIT complied with the written notice provisions of the subcontract [or proved an excuse for having failed to do so].

Finally, the issue of damages owed by MK to GIT was governed by the contract's termination-for-convenience clause, the termination-for-default clause, and common law. GP 55H, part of the contract's termination-for-convenience clause, provided that "The cost principles and procedures of FAR, Part 31 shall govern all costs claimed, agreed to, or determined under this article." Under those principles, as interpreted in the decisions of the federal courts and boards of contract appeals which handle most federal-contracting disputes, GIT bore the burden of proving damages in accord with the contract "with sufficient certainty so that the determination of the amount of damages will be more than mere speculation." MK, on the other hand, was not obliged to present evidence attacking items of damages if GIT had not made a *prima facie* showing that the items were properly included in its claim.

Worth mentioning here, is a one major difference between common-law damages for breach of contract and termination-for-convenience damages in federal contracting law. Common-law damages may include anticipated profits on work that a contractor was to perform under the terminated part of a contract. Convenience-termination damages under federal-contracting law may not.

6.2.2 COURT PROCEEDINGS (HIGHLIGHTS)

The case went under three extensive and complex trials totally. As mentioned above, at the first trial the jury found the termination wrongful and awarded GIT $5.6 million. Upon MK's appeal, the court reversed the damage award, and referred the case to a third trial to be held at a district court regarding the issue of damages alone. To document the analysis which follows, the issues brought up at the appeals court are mentioned briefly, along with a summary of the court's stand on them. The focus is on those issues more related to the actual project and not on the clearly legal procedures that led the court to its decision. The purpose of this section is to provide material on issues that could perhaps have been foreseen by MK at the time the decision to terminate was made.

The sole issue of liability at the initial trial was whether the default-termination was wrongful. By terminating GIT, MK indicated a belief that GIT was so far behind schedule, without adequate excuse, as to show a lack of diligence that made the project's timely completion uncertain. The termination was proper if such a belief was reasonable. In challenging the termination, GIT claimed that it had been entitled to extensions of time for various "excusable delays." The initial verdict may have been based on the fact that GIT was rightfully entitled to at least one excusable delay. This is the reason why the definition of excusable delays was revisited in court and its determination became the subject of a court instruction (see Section 6.2.1).

Because the first trial focused solely on whether the termination was wrongful, the issue of damages owed by MK to GIT was not settled to the satisfaction of MK. For purposes of analysis, it is appropriate to divide GIT's total claim of roughly $11.35 million into equitable adjustments ($3 million), lower-tier subcontractor claims ($3.7 million), attorney's fees ($1.35 million), unpaid contract work and post-termination equipment expenses and work ($1.9 million), and other ($1.4 million). All figures include overhead, profit, and bond. However, GIT offered no admissible evidence whatsoever to support its claim of roughly $1.35 million for attorney's fees. GIT also did not offer sufficient evidence to support its claims for roughly $3 million in equitable adjustments to the contract. Nor did it offer sufficient evidence of most if not all of the roughly $3.7 million in damages it claimed on behalf of its subs. Although the parties do not seem to dispute GIT's right to damages for work that the contract required, and that GIT performed, but for which MK did not pay, MK's argument with regard to damages primarily initiated from GIT's funding most of its damage evidence on a common-law theory of damages which was fundamentally inconsistent with the contract and the FAR. It did so, however, as part of its claim that the termination was not merely wrongful but also in bad faith. If GIT proved bad faith, it would recover full common-law damages for breach of contract. However, the court of appeals declined to submit a bad-faith claim to the jury, and GIT was forced to remove anticipated profits from its claim and adhere to damages recoverable under termination-for-convenience clause.

Instead, GIT had to obtain damages by proving entitlement to equitable adjustments to the contract price. An equitable adjustment is a change in contract price. It compensates a contractor for increased costs reasonably incurred because the government (or, in this case, MK) increased the amount or difficulty of work required by the contract, or delayed or accelerated that work. Some equitable adjustments are for work added by formal change orders. The contract included a standard clause allowing such orders. Other equitable adjustments result from "constructive changes," which occur when the government does something to increase a contractor's costs without issuing a formal change order.

To prove that it is entitled to an equitable adjustment, a contractor must show liability, causation, and injury. It must prove that the government somehow delayed, accelerated, augmented, or complicated the work, and thereby caused the contractor to incur specific additional costs. The contractor must not only prove that the government specifically caused its increased costs, but must prove that those costs were reasonable, allowable, and allocable to the contract. The contractor bears the burden of proof on all of those factors. GIT presented very little and insufficient evidence to show how MK's actions specifically caused GIT to incur the costs claimed in its damage claims.

Finally, an important issue raised, which should also have been foreseen at the time of the termination decision, was the settlement between GIT and its subcontractors. The contract allowed MK to terminate GIT either for convenience or default. If MK terminated GIT for default and a court found the termination wrongful, then the termination would convert to one for convenience. The standard termination-for-convenience clause for fixed-price construction contracts, established MK's and GIT's duties after such a termination. The clause obliged GIT to terminate its subcontracts, entertain termination-settlement proposals from its subs, and settle their claims. GIT would then make its own termination-settlement proposal to MK, and they would negotiate a settlement. GIT's proposal to MK would presumably include the costs it had incurred in settling and paying its subs' claims.

Because MK terminated GIT for default, however, the parties did not follow that procedure. GIT never settled with or paid three of its four subs. The contract set forth MK's obligations if it terminated GIT for convenience but then could not reach a settlement with GIT. Among scenarios contemplated by the contract, that is the closest analogue to what occurred. For work performed before termination, the contract obliged MK to pay GIT:

1. The cost of this work.
2. The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the [contract] if not included in subparagraph above.

MK argued that the contract barred GIT from recovering on its subs' claims unless it has "settled and paid" those claims, which it had not. The court of appeals did not reach a conclusion regarding subcontractor claims, despite the extensive legal literature referenced in the courtroom.

The case was forwarded to a new trial, as mentioned above, the scope of which was only the damages claimed by GIT on attorney's fees, equitable adjustment and subcontractor claims. These three issues should have been raised (and perhaps *were* raised) by MK at the time of the decision to terminate its contract with GIT.

6.3 ANALYSIS

The literature on this case is very extensive, and goes into great depths in the governing legal and contractual provisions. To analyze the case thoroughly would require much greater knowledge of the facts than was obtainable. Nevertheless, an effort if made to identify the value elements of importance mentioned in Table 4.2-I that played an important role in this case.

6.3.1 THE MONITORING FRAMEWORK - VALUE ELEMENTS

In this case, it is important that termination was not caused by the owner directly. This is a case of termination between a contractor and its subcontractor. Therefore, insight to the goals and values of both can be gained from re-examination of Table 4.1-I, part of which is presented modified below.

TABLE 6.3-I: ALIGNMENT OF CONTRACTOR'S - SUBCONTRACTOR'S INTERESTS IN THE MK V GIT CASE

Subcontractor's Objectives	• Achieve profit and other financial gains • Satisfy client and generate repeated business • Manage cash flow • Limit long term liability • Develop employees and create internal satisfaction • Optimize employment level within contractor organization
Subcontractor's and Contractor's Objectives	• Complete the project within budget • Complete the project within schedule • Maintain a high level of quality • Execute the project safely, without wasted time or accidents • Minimize claims and litigation

From the history of the litigation, it may be hypothesized that the contractor's motives may have been directed heavily towards maximizing profits in the expense of conformance to the schedule. Lacking access to contractual documents though, we are unable to determine the clauses that provided ground for such an incentive. Apparently, however, this misalignment of incentives may have initiated the problems that led to termination. From the background of the case, the most significant termination factors identified are shown in Table 6.3-II.

TABLE 6.3-II: RELEVANT TERMINATION FACTORS FOR MK

COST	• Significant cost overruns due to the contractor's performance, which the owner will bear based on the contractual agreement. • Any action of the contractor that increases the costs to the owner in the future or increases the risk of potential such costs, regardless of conformity to the contract. • Defective Specifications. • Percentage of subcontracted work. • The owner's conduct during the project in relation to the events mentioned above. • The uncertain costs of litigation deriving from termination. • The cost and availability of other contractors who may take over. • Financial state of subcontracts under the main contract and contractual obligations of the owner against them.
SCHEDULE	• Significant non-conformance to the schedule, with little hope of conformance in the future, corresponding to large costs to the owner. • Critical delays for which the contractor, subcontractors, material suppliers or labor unions are directly responsible. • The owner's interference and responsibility for delays. • Excusable/non-excusable, Compensable / non-Compensable delays • Unforseeability of critical delays • Percent of completed and paid work under the contract. • The owner's conduct during the project in relation to the events mentioned above.
QUALITY	• Unique technical expertise of the contractor. • Contractor commitment and cooperation. • Adversary Intent or Fraud: Once the courts have determined that a contract exists, they are bound to find that the contract imposes obligations of good faith, cooperation and fair dealing. • The owner's conduct during the project in relation to the events mentioned above.

The extensive list of monitoring factors in Table 4.2-I has been decreased to include those factors that, according to the historical background of the case and litigation, might have been known from the initiation of the decision to terminate. Care has been taken to account for the factors that a decision-maker would have been able to predict with the information (we assume) he/she had in hand at *that* time.

In selecting the appropriate termination factors, we assumed that the decision process started in September 1995, right before the termination decision. At that time the project was already around 30% through its official schedule (22 months). Also, we will assume that it is *not* true that GIT's plan was to complete the project before its required deadline, which displeased MK, and MK in turn, caused some of GIT's delays[12]. This assumption is likely, since GIT was not able to prove bad faith on behalf of MK.

Finally, for simplicity and because no contrary information is available, it is assumed that the project in hand is a "commodity-type" project, one for which quality is not a significant issue. On the other hand, environmental impact and sociopolitical effects *could be* important potentially, but no information to support this is available. Therefore, for the purpose of building the list of monitoring factors, it has been ignored.

[12] Again, it should be noted that these are assumptions made for the purpose of the illustration. No hard evidence exists to prove such claims or refute them.

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